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ANTERIOR COLPORRHAPHY AND AMPUTATION OF THE CERVIX COMBINED AS A SINGLE OPERATION FOR USE IN THE TREATMENT OF GENITAL PROLAPSE.

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MANCHESTER, ENGLAND.

The classical method of treating prolapsus uteri consists in removing a portion of the anterior vaginal wall, amputating the cervix if it is elongated or diseased, and repairing the perineum. Up to the present time no better method than this has been devised, although numerous freak operations have been suggested and tried, and though the abdominal as well as the vaginal route has been freely used, anterior colporrhaphy and amputation of the cervix are now done more successfully than was possible twenty years ago. Their technic has been improving steadily all the time, and so has that of perineorrhaphy. Indeed, these operations are now so successful that abdominal operations for prolapse may be said to be quite unnecessary.

The object of this communication is to describe two modifications which are useful in operating on the anterior vaginal wall and cervix.

In ordinary anterior colporrhaphy, the portion of the vaginal wall which is removed is oval or lozenge-shaped, the wound being broadest in its central portion and narrowing towards the cervix (Fig. 1). When this wound is sutured from side to side, tissue which was previously at the sides of the vagina is brought together in the middle line in front; the vagina is narrowed and cystocele is cured; but the operation has no special effect on the position of the uterus, which is always retroverted in cases of prolapsus. In the normal subject, the cervix is held upwards and backwards by the parametric tissue on either side of which, contains much smooth muscle and firm connective tissue. In prolapsus, the parametric muscle is atrophied and the two lateral pedicles of the uterus are elongated so that the cervix drops forwards and downwards, the body of the uterus passing backward into a position of retroversion. To correct this surgically, it is necessary to shorten the parametric pedicles on both sides. But these cannot be cut and shortened absolutely, because they contain the main blood supply of the uterus. It is possible, however, to shorten them relatively by making them follow a longer course; in other words, by curving them forward so that

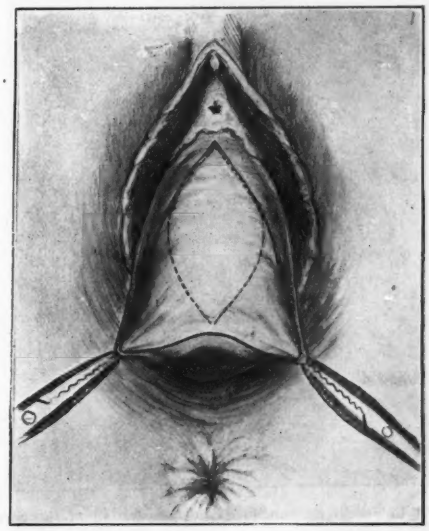

Fig. 1. Colporrhaphy without amputation of the cervix. The dotted line shows the usual incision. The plain line shows the author's incision, extending upwards and backwards on either side of the cervix.

they meet on the middle line in front of the cervix before passing on to enter the cervix laterally. If the anterior colporrhaphy wound be extended upwards and backwards on either side of the cervix onto the roof of the vagina, the wound exposes the paramterium on either side (Fig. 1), If the wound be then closed from side to side, the tissues which formerly lay at the sides of the cervix are united in the middle line in front of the cervix, which is thus pushed upward and backward toward the hollow of the sacrum. The body of the uterus at the same time passes forward into a position of anteversion, where it is kept by intra-abdominal pressure. The recurrence of prolapse is thus effectively prevented, and the operation is completed by a mod-

erate repair of the perineum done only to restore the natural size, slope, and curve of the vagina.

The anterior colporrhaphy wound is thus not an oval but a triangle, whose apex is just behind the urethral orifice and whose broad base crosses the anterior vaginal fornix just in front of the cervix. I first advocated this modification in the *Transactions of the Edinburgh Obstetric Society,* 1907-08, and have used it constantly both before and since that date, with complete satisfaction.

The operator who would secure success in operating for prolapsus must remove the cervix when it is ulcerated, badly lacerated, or hypertrophied, and when the uterus is more than three inches in length. The usual procedure is to begin the opera-

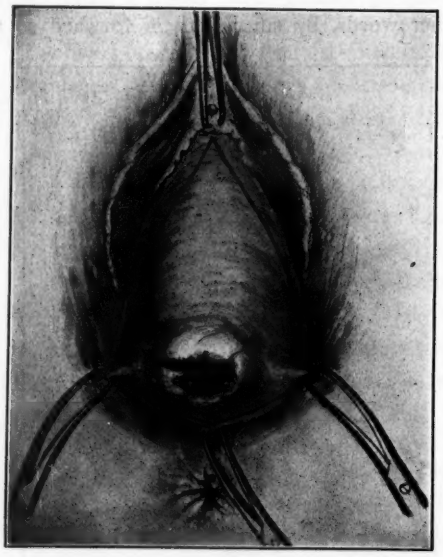

Fig. 2. Colporrhaphy combined with amputation of the cervix. The line of incision.

tion by an ordinary amputation of the cervix, leaving a transverse line of suture with the os uteri in its center. This somewhat shortens the anterior vaginal wall and so tends to pull the cervix down and forward. The next stage of the operation is an ordinary oval anterior colporrhaphy, which is not so extensive as usual, owing to the previous amputation of the cervix. Thus after the two separate operations have been done, which occupies a considerable time, the uterus is left in retroversion and the os uteri is nearer than it should be to the vaginal outlet. The perineum must then be extensively repaired and the vagina must be left very narrow indeed if recurrence of the prolapse is to be prevented.

These difficulties can be avoided by combining the two operations in one, as described by me in the *British Medical Journal,* April 12, 1913. Since that date the technic of the combined operation, as done by the writer in several hundred cases, has been altered and further improved. It is now done as follows:

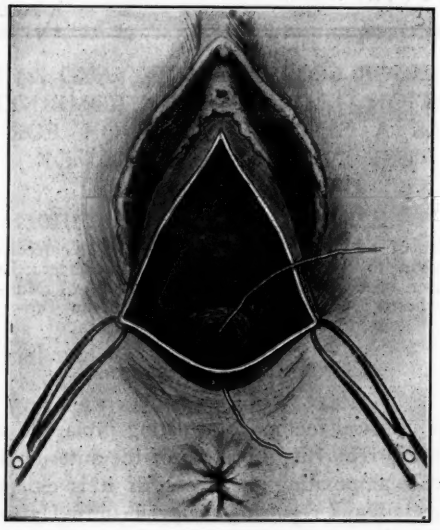

Fig. 3. Colporrhaphy combined with amputation of the cervix. The triangle of vaginal wall has been removed with the cervix in one piece. The suture has been inserted from the cervical canal through uterine wall and vaginal wall.

Pull down the cervix with a volsellum and dilate it thoroughly; measure the length of the uterus and curette it.

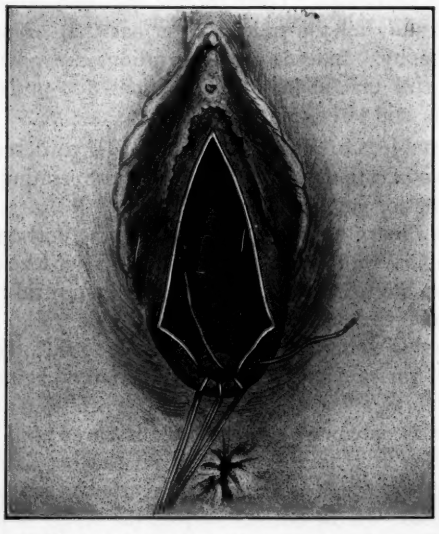

Fig. 4. Colporrhaphy combined with amputation of the cervix. The first three sutures have been inserted and tied. They are left long and serve as tractors until the suturing of the cervical stump is complete. The fourth suture has been inserted through the vaginal wall and uterine wall into the cervical canal.

Pick up four points with forceps, one just behind the urethral orifice, one at the junction of the cer-

vix with the posterior vaginal wall in the midline, and one on the vaginal wall on either side of the cervix. These two lateral points should be well apart, from one-half inch from the junction of cervix and vaginal wall. They should be if anything a little behind the cervix rather than in front of it (Fig. 2).

Next cut through the vaginal wall with a knife so that the incision connects the fourt points picked up. Beginning at the apex of the area marked out, just behind the urethra, strip off the vaginal wall enclosed by the incision from the bladder and from the paravaginal and parametric tissue; but leave it attached to the cervix. Then, pulling on the flap of vaginal wall, snip round and round the cervix until the portion to be removed is free from its attachments.

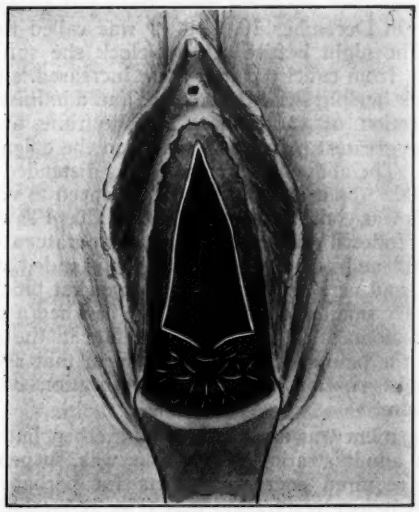

Fig. 5. Colporrhaphy combined with amputation of the cervix.

The suturing of the stump of the cervix is complete. The first suture uniting the sides of the wound has been inserted and tied.

Next cut straight across the cervix, so that it comes away together with the freed portion of vaginal wall (Fig. 3), leaving the uterus three inches long.

The first suture is passed from within the cervical canal through the back of the cervical stump and through the posterior vaginal wall in the middle line. This is tied and the second and third stitches are passed and tied one to the right, the other to the left of it, bringing the cut edge of the vaginal wall to the cut edge of the cervical mucosa (Fig. 4). When about nine stitches have been inserted the stump of the cervix is covered in and the sides of the wound approach each other in the middle line in front of the cervix (Fig. 5). By this time the stump begins to pass up and back toward the hollow of the sacrum. The stitches must be tied with the fingers inside the vagina; for, if enough vaginal wall has been removed, the sides of the wound will not come together unless the uterus is well within the pelvis (Fig. 6).

The remainder of the incision is closed from side to side by interrupted sutures, as the use of continuous or mattress sutures shortens the incision and pulls the cervix downward. At the end of the operation the stump of the cervix is quite out of sight, high up and far back, and the uterus is in a position of anteversion. Catgut is the only suture material, as it is impossible to get access to the parts for removing stitches after this operation.

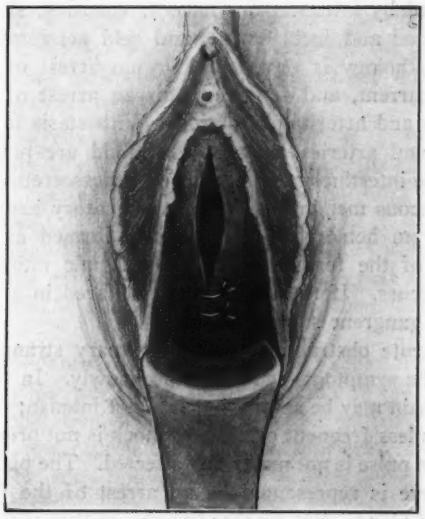

Fig. 6. Colporrhaphy combined with amputation of the cervix.

More sutures have been inserted, tied, and cut. The stump of the cervix has passed upwards and backwards into the hollow of the sacrum and is no longer visible. The uterus is now anteverted.

The perineum should be repaired, but there is no need to narrow the vagina. It should admit a large finger easily when all the sutures have been inserted.

Besides having the advantage of combining two operations in one, this method has given me results which are anatomically superior to those previously secured. It has repeatedly stood the test of parturition without recurrence of prolapse, and has been used upon several patients over 70 years of age. Though at first sight a difficult and rather a bloody operation, those who have done it a few times state that it is not only quicker, but also easier than the usual amputation of the cervix, followed by the usual colporrhaphy.

ACUTE AND CHRONIC INTESTINAL OBSTRUCTION.

A. H. Levings, M.D.,
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It is not my purpose to consider all forms of acute and chronic intestinal obstruction, but rather some of the more important phases of the subject.

Obstruction of the bowels may be divided, primarily, into the acute and chronic forms, and the acute subdivided into those with strangulation and those without strangulation.

Acute obstruction with practically coincident strangulation occurs with especial frequency in hernia. Here the process comes on suddenly, and is attended by intense pain, nausea, vomiting, shock, quickened and feeble pulse, and cold perspiration. The pathology is represented by an arrest of the fecal current, and following this an arrest of the venous and arterial circulation. With stasis in the veins and arteries, quantities of fluid are poured into the intestines as the result of hypersecretion of the mucous membrane, from inflammatory exudate and from hemorrhage. Gases are formed as the result of the fermentation, and systemic intoxication occurs. If the bowel is not relieved in a few hours, gangrene supervenes.

In acute obstruction without primary strangulation, the symptoms come on more slowly. In these cases pain may be severe, but it is not intense; vomiting is less frequent or absent; shock is not present, and the pulse is not materially affected. The pathology here is represented by an arrest of the fecal current alone. But Kocher has shown that obstruction of the fecal current, without injury to the mesenteric vessels, soon leads to venous stasis, and in some cases to necrosis and perforation. Consequently the end-result of acute obstruction is not materially different from that of strangulation. We are well aware of the fact that in acute obstruction the intestinal microorganisms pass into and through the walls of the intestine, and may lead to peritonitis, if relief is long delayed.

The most frequent causes of strangulation and acute obstruction are hernia; bands of fibrous tissue; Meckel's diverticulum; post-operative kinking of the bowel from adhesions; intussusception; rotation of one or more coils of intestine about their axes, or one coil about a loop of intestines like a skein of yarn; volvulus; embolism of the superior mesenteric artery, or thrombosis of the superior mesenteric vein; adventitious or congenital rents in the mesentery through which a loop of bowel may pass and becomes strangulated; a dynamic obstruction as the result of paralysis of the musculature of bowel from peritonitis; and dynamic obstruction when the bowel is acutely stenosed as the result of reflex spasmodic contraction, as may occur in orchitis, during the passage of gall-stones, or urinary calculi, and in some cases of peritonitis.

A case quite recently came to my attention where strangulation was through an adventitious or congenital rent in the mesentery:

A woman 58 years of age had been complaining for a number of years of colicky pains in the abdomen, which increased and then almost disappeared. She had become greatly reduced in flesh and weakened on account of these recurring attacks, which were very severe and often confined her to bed. She had been under the care of a number of physicians, and at times the diagnosis had been appendicitis. and then duodenal ulcer, and again cholelithiasis. On December 10, 1914, I was called to see her. The night before at 10 o'clock she suffered severely from colicky pains; these increased, and at 2 o'clock her physician was called and administered an injection of morphine. At the time of his visit the greatest pain was situated in the epigastric region. The abdomen, however, was distended and sensitive. About this time she commenced to vomit, and this was continued up to the time that I saw her on the following evening. Her temperature then was 101° and pulse 110; abdomen distended, tympanitic, and very sensitive; face somewhat pinched; pulse very small and weak. As she had had a great deal of stomach and duodenal trouble in the past, and as the pain seemed to originate in that region, I thought possibly there was perforation of the duodenum.

The patient was anesthetized with ether, but during its administration respiration was suspended, and it required energetic efforts for perhaps ten minutes before respiration was fully re-established. The abdomen was then opened, and a quantity of bloody fluid evacuated. The stomach and gall-bladder were found intact. A mass was felt in the pelvis, which, when brought into the wound, was found to consist of coils of small intestine, that had passed through a slit in the mesentery, and then rotated two or three times upon themselves. The coils were black. It was impossible to reduce them without splitting up the mesentery. Then it was found that six feet of the small intestine, from the cecum upward, was involved. Hot cloths were applied for ten minutes, but the color did not improve and the circulation could not be made out in the vessels. Consequently this portion was resected, the ends closed, and a lateral anastomosis made. When the abdomen was closed, the patient was practically pulseless, but she survived until the following evening. The time of the operation was one hour and twenty minutes.

I have no doubt that these coils of intestine had been through this slit for many years, and became strangulated only when rotation occurred. I feel that if we had expedited the operation a little more,

and had not had the trouble with the anesthetic, the patient might possibly have been saved.

Obturation of the bowel: This may be defined as a condition in which there is partial or at times complete arrest of the fecal current, without interference with the circulation of the blood. Such a condition may occur with enteroliths; with gall-stones that have ulcerated their way from the gall-bladder into the intestine; with tumors situated within the bowel, or making pressure upon it from without; from cicatricial contractions; adhesions; kinking; volvulus, where not more than two-thirds of the sigmoid is involved; and at times in intussesception. I encountered a case where a loop of small intestine had been produced by adhesions and at the apex of the loop a very hard enterolith had formed, almost completely filling the lumen of the bowel.

In obturation there is increased peristalsis, colicky pain, distention, and occasional vomiting. There is also at times the passage of small quantities of fecal matter and gas.

Chronic obstruction: This is ordinarily due to the gradual narrowing of the lumen of the bowel and is usually in the large intestine. It may be due to fecal accumulations, to Meckel's diverticulum, tumors, acquired diverticulitis, cicatrices, but it is most frequently due to a carcinomatous growth.

There are certain signs and symptoms in acute and chronic obstruction to which I desire to call special attention. The first is the absence of fever for from 24 to 60 hours in practically all cases of acute mechanical obstruction. After 60 hours there will be absorbed sufficient ptomaines, toxins, or ferments to cause fever. In cases of post-operative obstruction, as well as in those of adynamic obstruction, fever will precede the signs and symptoms of obstruction.

Paralytic and dynamic ileus: Paralytic or adynamic ileus has usually been considered a result of peritonitis, the musculature of the bowels being paralyzed as the result of the inflammatory process.

Nothnagel says that no one doubts the occurrence of paralysis of the bowel as the result of either peritonitis or over-distention, but he also holds that there is a purely functional or nervous form. Van Hook, accepting this view of Nothnagel's, divides adynamic and dynamic ileus into: first, functional nervous paralysis of the intestine; second, motor insufficiency due to marked anatomic lesions of the intestine; third, embolism of the mesenteric artery, and paralysis from over-distention by gases; fourth, toxic cases due to the action of drugs or toxins; fifth, paralysis of central origin, as tabes; sixth, reflex dynamic obstruction as from orchitis, renal colic, gall-stones, etc. Nothnagel holds that the mechanism of intestinal obstruction in these cases is as follows: There occurs motor insufficiency in the intestinal wall, with the result that the contents of the affected segments remain stationary; with stasis of the bowel contents accumulation occurs, and the bowel is successively filled from the point of paralysis upwards to the stomach.

Lichtenstein thus explains the vomiting of enormous quantities of fluid, which occasionally occurs in intestinal obstruction: The coils of intestine that have a long mesentery and are situated above the obstruction become distended with gas and fluids, and rise up towards or against the abdominal wall, while the more fixed portion, the first part of the jejunum and the duodenum, are held down to the spinal column, with the result that when the patient lies on his back the fluid contents of the intestine pass upwards into the stomach.

Diagnosis: In the strangulation or acute obstruction of a loop of a bowel in one of the external hernial openings there is usually no difficulty in the diagnosis.

Strangulation or acute obstruction within the abdomen may be diagnosed, but the actual seat or cause will be difficult to determine without exploration.

Post-operative obstruction from adhesions and kinking of the bowel usually occurs a few days after operation, where there was pre-existing peritonitis, and especially where drainage was resorted to. The condition should be differentiated from post-operative paralysis of the stomach which is of more frequent occurrence. In the latter, the epigastric region becomes greatly distended with frequent retching and vomiting. The abdomen is not distended, however, increased peristalsis is not present, and the bowels, though perhaps difficult to move, are not obstructed. Stomach lavage, restriction in stomach feeding a change of position from the back to the side or abdomen, and a few doses of strychnine will clear the diagnosis and usually cure the patient.

Intussusception is most frequent in children. It come on suddenly with shock, vomiting, severe peristalsis, and colicky pains recurring every few moments, often with a round or sausage-shaped tumor somewhere in the large intestine, and bloody mucous discharges.

I have seen and operated upon several cases of paralysis of the bowel from embolism of the superior mesenteric artery or from thrombosis of the superior mesenteric vein, and in not a single case

was a correct diagnosis made before operation. The symptoms are those of acute obstruction. A diagnosis perhaps might be made with a more careful examination and a knowledge of the facts that embolism rarely occurs except in patients with valvular heart disease, ulcerative endocarditis, or aortic aneurism, and that thrombosis of the superior mesenteric vein is predisposed to by ulceration or septic processes in the area of origin of the vein.

Volvulus of the sigmoid is not frequent, but may occur in persons past middle life. An elongated mesentery, chronic constipation, and kinking of the sigmoid by adhesions seem to favor the rotation. These persons suddenly develop the symptoms of acute strangulation. In addition there is intense pain in the left side and a tumor.

In the differential diagnosis of obstruction, one must consider perforation of the duodenum, stomach, gall-bladder, and appendix; also acute pancreatitis, torsion of the pedicle of a tumor, and acute unilateral hemorrhagic infection of a kidney.

Chronic obstruction: This condition should usually be readily diagnosed. It occurs most frequently in persons advanced in years. There will be for months an increasing difficulty in getting the bowels to move, and when the lumen of the bowel is markedly narrowed, there occur distention of the abdomen, with tympanites, and a greatly increased peristalsis above the seat of obstruction. These contracting, stiffening, and moving coils of intestine can plainly be seen and felt in persons with thin-walled abdomens, as the peristaltic waves progress from above downwards to and against the seat of obstruction, where they break and disappear like waves against the shore. These waves recur every few minutes, and are attended with pain, often severe, and a gurgling, rushing noise. In every case in which chronic obstruction is feared, the abdomen should be uncovered and attentively observed for a few moments. In chronic cases, vomiting is not frequent, while the passage of fecal matter and gas is much restricted.

The seat of obstruction: Tavel has analyzed the symptoms of obstruction according to its seat as follows:

Pyloric obstruction: vomiting of mucus mixed at times with blood, stomach distended, pain in epigastric region, passage of gas or stools infrequent.

Duodenal obstruction: vomiting of food with or without bile and pancreatic juice, patient ejecting much more fluid than has been taken, stools and gas rare.

Ileo-cecal obstruction: vomiting not so frequent, stools and gas absent, localized tenderness in ileo-cecal region, meteorism.

Sigmoid: vomiting infrequent or absent, stools and gas absent, meteorism very pronounced, enemas not well supported.

In my own practice I have been in the habit of relying on a few signs such as the following:

The higher the obstruction the more frequent the vomiting and the less the urinary output. If the obstruction is at the pylorus or in the duodenum, the stomach only, or the stomach and a portion of the duodenum will be distended. If the obstruction is at or near the ileo-cecal valve, the umbilical region or the center of the abdomen will be distended, while the flanks will be flat. If the obstruction is in the lower sigmoid or upper rectum, the entire abdomen will be about equally rounded out and distended. I also take into consideration the point of breaking of the peristaltic wave, which is very suggestive of the seat of obstruction.

Prognosis: According to the statistics of Golddammer, about one-third of the patients suffering from intestinal obstruction, as clinically diagnosed, can be cured without operation.

According to Naunyn, of 288 cases of ileus, 75 per cent. were saved by operation on the first or second day, and only 35 to 40 per cent. of those operated upon on the third day were saved.

Insofar as operative measures are concerned, it is a well-established fact that the earlier the operation the greater the number of recoveries.

Treatment: Strangulated hernia: Here I would advance the proposition that in case reasonably skilled surgical help can be obtained in reasonable time, taxis should not be employed. I make this proposition because: first, I believe a strangulated hernia is seldom reduced by taxis; second, taxis in the majority of cases only traumatizes an already injured intestine, lowers its vitality, and causes delay in operating. I have seen intestinal loops ruptured by taxis with death of the patient. I have seen reduction *en bloc* with death of the patient, and I have many times seen a loop of intestine so traumatized by taxis that its vitality was destroyed and resection was required.

The mortality following the operation for the radical cure of hernia is almost nil, while the mortality following delayed operations for the relief of strangulated hernia has ranged from 20 to 50 per cent. This increased mortality can be charged almost wholly to injudicious taxis, to delay in relieving the constriction, to the weakening of the patient from pain, vomiting, and inability to take food, and to toxemia.

If one succeeds in reducing a strangulated hernia, his patient must wear a truss, and each day be subjected to the risks of a restrangulation, and probably subsequently submit to an operation for the radical cure. Why not operate at once, relieve the strangulation, perform a radical hernia operation, and cure the patient almost without risk?

For the relief of post-operative ileus I would strongly advised against delay. One of two methods may be followed: 1. Without an anesthetic or under light anesthesia a few stitches are removed and the first distended loop of intestine that presents is brought into the wound fixed and drained. In many cases after the distention is relieved the bowels commence to act through the natural channel and the fistula closes spontaneously. 2. After the abdomen is opened or in cases where it is being drained, remove the drain, flush out the wound, pass in the finger and sweep it around, breaking up the adhesions. Of course, there is some danger in drainage cases of setting up a general peritonitis, but if one follows the procedure with the employment of a cigarette drain, this will be reduced to a minimum.

Intussusception: Filling the colon with fluid or gas may be resorted to with the hope that the intussusception will be corrected. As a rule, the earlier the operation the better the chances of success. In these cases, after the abdomen is open, there should be no effort made to drag the intussusceptum out, but rather to milk it back or "back it up" from the apex.

Edward Peterson gives the following statistics (*Medical Record*, February 6, 1915):

In a study of 557 cases of intussusception, Leichstern placed the mortality at 73 per cent., and during the first year of life at 88 per cent.

Kock and Orrum in a study of 400 Danish cases gave the mortality in the first year of life at 60 per cent.

Clubb treated 173 cases, 16 of which were successfully reduced by enema. Of 157 cases operated upon, his results are as follows: In the first 50 cases there were 25 deaths, in the second 50 cases 12 deaths, in the third 50 cases 4 deaths, in the remaining 7 cases all recovered. In Clubb's last 50 cases, the average time from the onset of symptoms until the operation was 17 hours.

Peterson says that after 48 hours in a considerable proportion of cases the invagination is either irreducible or gangrenous and resection of the bowel or enterostomy is required. When either procedure is necessary the mortality is frightfully high.

In adynamic obstruction, repeated stomach lavage with colonic flushing will be of benefit. The treatment, however, should be preventive.

In enterospasm or dynamic ileus stomach washing and morphine in full doses should be resorted to.

In chronic obstruction, early operation—before the patient's strength is wasted by pain, loss of sleep, want of nourishment, vomiting, and toxemia—offers the only hope.

There are three points that I think should be emphasized: First, in all cases of acute obstruction purgatives are absolutely contraindicated, and can only do harm; second, in all cases of acute obstruction repeated lavage of the stomach is of the greatest benefit; third, no patient suffering from obstruction should take an anesthetic without having his stomach previously emptied. In cases where this precaution was omitted, I have seen patients practically drowned from their stomach contents while being anesthetized, and but recently, before an operation for obstruction in the sigmoid, more than a gallon of very offensive fluid was evacuated from the stomach through a tube.

In many of these cases after the stomach is emptied the distention will have been diminished greatly and the operative manipulations rendered much easier.

INTESTINAL RESECTION.

Lateral anastomosis is applicable to almost any portion of the bowel, provided only that sufficient length and mobility exist to allow of the desired arrangement of the free ends. It is the normal method of enterectomy in the large intestine, the transverse colon, the sigmoid flexure and the pelvic colon offering the only debatable exceptions.—FRANCIS REDER in *The Lancet-Clinic*.

INTESTINAL ANASTOMOSIS.

First of all, the surgeon, before he undertakes to anastomose a bowel, will see that he has an abdominal incision rightly placed and sufficiently large not to incumber him in his work. If the primary abdominal incision does not permit of a proper exposure, a supplementary incision that will meet the requirements must be made. For example, a strangulated femoral hernia will invariably demand an additional incision, the so-called working incision. Often intraabdominal conditions will reveal the intestine so fixed by inflammatory products that a supplementary incision becomes imperative.—FRANCIS REDER in *The Lancet-Clinic*.

SOME OBSERVATIONS ON MESENTERIC OCCLUSION.

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The bibliography on this subject is not extensive. Virchow first described the pathology in 1847. Welch carefully reviewed the subject up to the year 1900. As many as seventy cases of mesenteric thrombosis and embolism had been reported at that time. Gerhart and Kussmaul in 1864 had studied the clinical features. Watson and Elliot in 1895 considered fifty cases in analysis from a surgical standpoint. Welch and Mall, Litten, Faber, and others have studied mesenteric occlusion experimentally. The work of Welch and Mall seems the most thorough and satisfying.

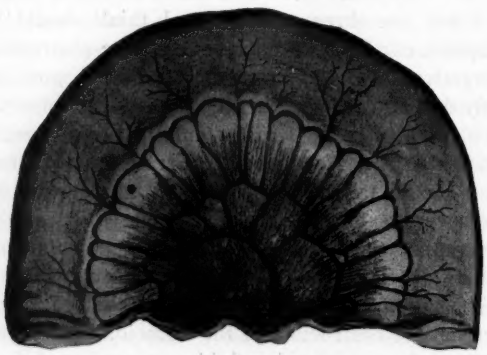

Fig. 1. Three feet from end of duodenum. Intestine twenty-three feet long (Monks). Note the system of loops formed by the branches of the mesenteric artery—primary, secondary and even tertiary. The vasa recti also provide very free communication between the terminal vessels on the surface of the bowel.

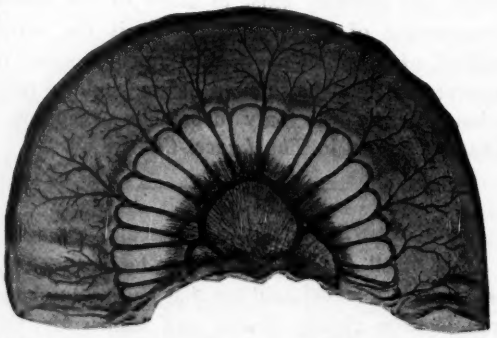

Fig. 2. Six feet from end of duodenum. Intestine twenty feet long (Monks).

Since the year 1900 there have been several reports. Jackson, Porter, and Quimby review 214 cases in 1904. Elliot's resection of four feet of infarcted intestine and Gordon's resection of two feet of infarct are the only two cases successfully operated up to the year 1900. Jackson, Porter, and Quimby's reports note four successfully operated cases out of forty-seven operations. Wakefield in 1911 reports a successful resection of 30 inches of intestinal infarct.

The establishment of collateral circulation in most parts of the body seems easily accomplished. This is a wise and beneficent provision of nature. The mesenteric and intestinal anastomosis is larger and freer than any other part of the body. It seems that here we should have most easily established a compensatory collateral circulation. If we eliminate all factors except merely mechanical occlusion, we no doubt would have a collateral circulation as easily established as elsewhere. The modifying factors are: first and most important,, the presence of infection. The other factors are the amount of mesentery occluded and the suddenness of the occlusion.

Fig. 3. Nine feet from end of duodenum. Intestine same as No. 1 (Monks).

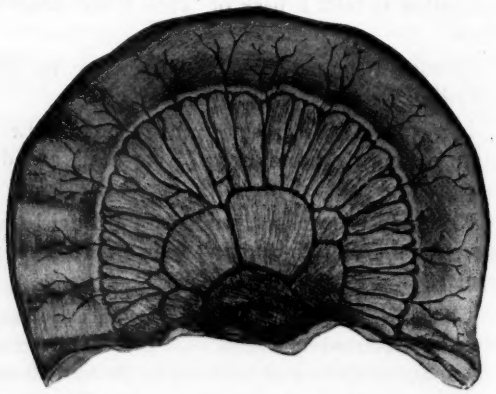

Fig. 4. Twelve feet from end of duodenum. Intestine same as No. 1 (Monks).

Thrombosis of either veins or arteries produces hemorrhagic infarct and consequent necrosis. Almost uniformly it is an hemorrhagic infarct. Faber has attributed the infarct to back pressure in the portal system being greater and overcoming the

pressure from the anastomosing vessels. However, hemorrhagic infarct results as readily when the mesenteric vein is thrombosed or tied. The studies of Welch and Mall are most rational and seem to furnish the best explanation of the phenomena. Their conclusions from experimenting on dogs were that the blood producing hemorrhagic infarct enters by anastomosing vessels and not by

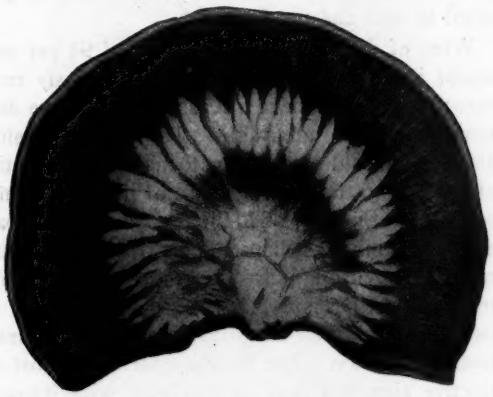

Fig. 5. Seventeen feet from end of duodenum. Intestine same as No. 1 (Monks).

reflux from the veins—that infarct is not due to demonstrable changes in vessel walls, but to retardation and stasis of the circulation, clumping the red cells in veins and capillaries and diapedesis. Another factor also is loss of lateral pulsation in the vessels. Perhaps a still more important factor

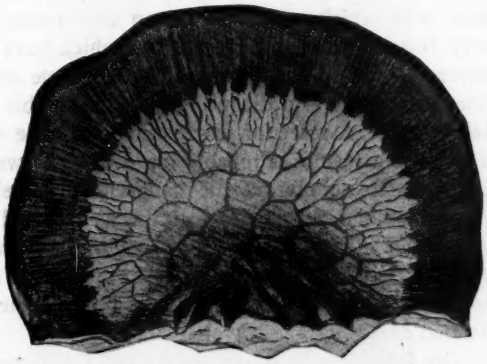

Fig. 6. Twenty feet from end of duodenum. Intestine twenty-one feet long (Monks).

is the violent tonic contractions of the intestinal walls which takes place when a vessel is occluded, producing ischemia for two or three hours, followed by relaxation and infarct. Now, why conclude that infection is the most important element entering into the establishment of hemorrhagic infarct of the intestine and mesentery? If to ischemia followed by dilatation and engorgement of vessels, stasis of current, clumping of cells, and diapedesis, we add infection with consequent changes in the vessel walls, we account most readily for the escape of the blood-making infarct. Also infection explains more readily the progressive character of the occlusion noted in many cases. Most cases met with clinically are associated with some infec-

Fig. 7. Dog. No. I. Ligature around mesenteric branch near base. Pulsation ceased in two-thirds of the mesentery from cecum upward.

Photograph No. 1 taken before ligation.
Photograph No. 2 taken 15 minutes after ligating.
Photograph No. 3 taken thirty minutes after ligating.
Photograph No. 4 taken ninety minutes after ligating.
Photograph No. 5 taken twenty-four hours later. No pulsation in the tied mesentery but no infarct. Abdomen closed again. Seventy-two hours later dog died. No marked infarct or gangrenous intestine. Peritonitis and adhesions.

tive condition. Those due to embolus may be from infected emboli. The remarkable case reported by Chiene, in which the celiac axis was entirely occluded and collateral circulation established, indicates the great possibilities of compensating circulation in this region.

The great size and extensive area supplied by the superior mesenteric artery, compared with the rel-

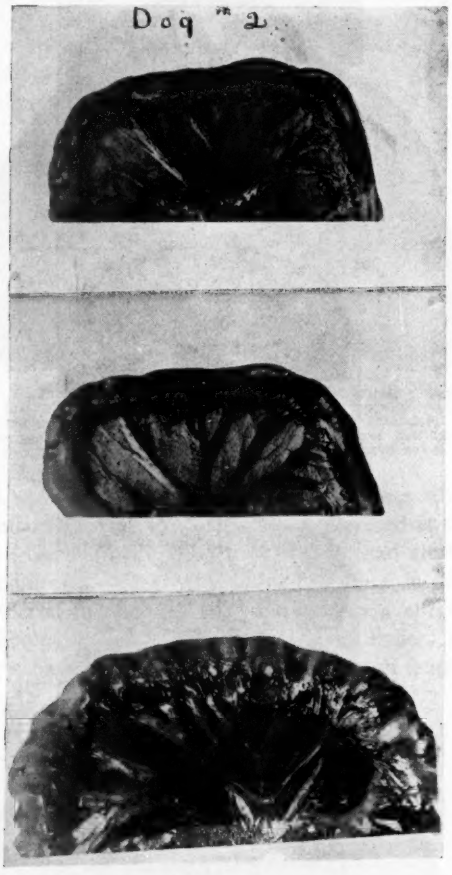

Fig. 8. Dog No. II. Tied five vasa recti about one foot from the ileo-cecal valve.

Photograph No. 1 taken fifteen minutes after opening abdomen and five minutes after tying vessels.

Photograph No. 2 taken thirty minutes later and abdomen closed. This picture shows a marker indicating where visible pulsation ceased about two inches to the right of the vessel which was not tied.

Photograph No. 3 taken after opening the dog nine days later. No infarct and no gangrene. Intestine warm but without visible pulsation. Collateral circulation seems to have been established. Ether forced to kill dog. Noted after death for thirty minutes the slow peristaltic contraction wave produced by mechanical irritation. From the point of irritation the wave slowly extending downward.

atively small inferior mesenteric, makes easily accountable an infarct when the entire vessel is occluded. A sudden occlusion with the consequent phenomena of tonic intestinal contraction for some hours would make impossible a compensatory circulation before lethal changes in cells and vessels would take place and easy infection come from the intestinal tract. However, when we think of a branch or even several branches of the superior mesenteric itself being occluded, we wonder why there should ever be death of the part, considering the marvellous provision for collateral circulation through the numerous vessel loops in the mesentery. Such a free and large anastomosis should easily compensate for considerable occlusion. This beautiful arrangement of anastomosing vessels is provided in man and not in dogs!

What of diagnosis? A mortality of 94 per cent. would indicate that diagnosis is most easly made post-mortem. To make a reasonable tentative diagnosis would be admirable. To make a positive diagnosis would serve only to accent the egotism of the diagnostician. A picture of ileus is the most common. Sudden and intense abdominal pain, nausea, vomiting, collapse, subnormal temperature, rapid low tension pulse, rigid abdomen and distended later, perhaps bloody stools if diarrhea occurs—a picture like intestinal obstruction or intestinal perforation. The bloody stool is the most distinctive sign, but may be confused with intussusception. If given such a picture and an additional known source of embolus or a previous embolism elsewhere, we might guess a diagnosis.

The treatment of so grave a condition might be bettered by some forethought. A thorough knowledge of the anatomy and probable pathology in addition to extensive experience in abdominal surgery would be the most favorable equipment for one to have with which to meet such an emergency. A very few cases have been reported which have recovered as has been indicated. They come to us unexpectedly after a diagnosis of other trouble has been made. A resection is sometimes possible with a favorable result. Probably more often it would be wiser to simply fix the gangrenous bowel in the abdominal wound and drain as advised by Moynihan. There is no doubt that in many cases the process is progressive, and what appears at first to be a promising case disappoints because the infection and gangrene travel further.

The following two case reports are from my experience:

I. January 30, 1908. L. M., male, white, farmer, married, aged 26 years.

Family history: A brother had an appendicitis; negative otherwise.

Previous history: Last October suffered five days from an attack like the present one.

Present trouble: About 4:00 A.M. to-day, after getting up to make fires, he went back to bed and began to have severe pains in the abdomen, followed by vomiting. A physician arrived about 8:30 A.M. and made a diagnosis of acute appendicitis.

Later in the day he was moved seven miles in a spring wagon to the train and came nine miles on the railroad to the hospital. He suffered great pain all day. Received castor oil, enemas and, morphine. I saw him later in the afternoon. He had a rigid abdomen; temperature, 97° F. I made a diagnosis of perforated appendix.

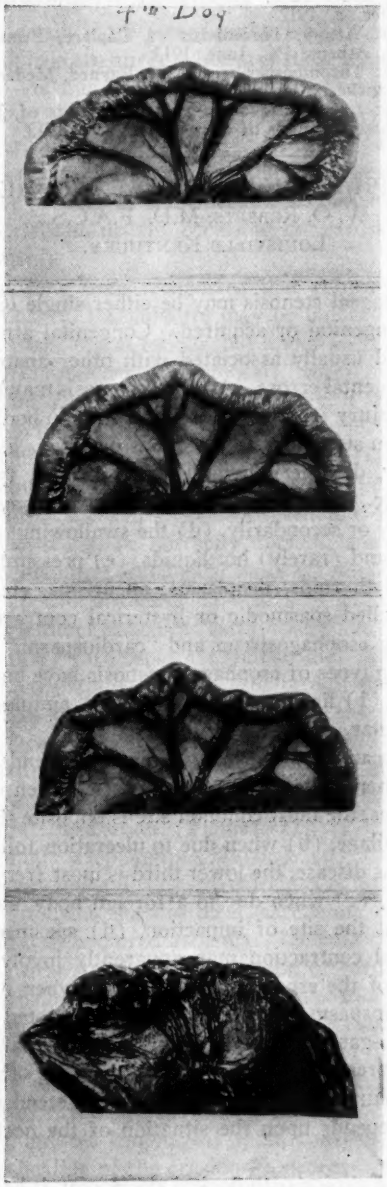

Fig. 9. Dog No. IV.
Photograph No. 1 before tying.
Photograph No. 2 taken fifteen minutes after tying.
Photograph No. 3 taken thirty minutes after tying.
Photograph No. 4 taken of infarct. The dog died about thirty-six or forty hours after time of opening. Infarcted mesentery in the lower two-thirds. The infarct was more extensive than the pulsation occluded from the ligature at first. Dog had tarry stools and bloody serum in peritoneal cavity.

Operation, 8:30 P.M. Found perforated appendix and escaped fecal concretion; also a thrombosed mesentery in the lower part of ileum. Removed appendix; resected 45 inches of ileum with end-to-end anastomosis. Drained. Wound partly closed. Shock. Proctoclysis. I saw the patient only once more, the following morning. Bedside notes indicated that the two days following operation temperature went to 99° F. He had much pain and considerable abdominal distention. Passed gas after enemas. After the second day his temperature went to 102° F. On the seventh day he had a large bowel movement and on that day a bloody serum escaped from around the rectus muscle. Next day it had a fecal odor. No fecal discharge and the finger in the wound seems to find it walled off. A loop of dark bowel in the pocket. The last two days of his illness he suffered much more pain and abdomen became more distended, pulse weakening and more rapid, dying February 9, after living eleven days. No autopsy.

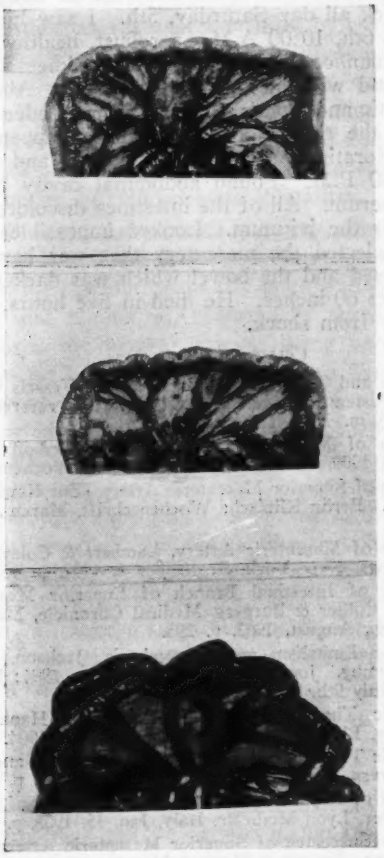

Fig. 10. Dog No. V.
Photograph No. 1 taken after tying the entire superior mesenteric artery.
Photograph No. 2 taken thirty minutes later.
Photograph No. 3 taken twenty-four hours later. Post mortem. Shows hemorrhagic infarct.

July 6, 1913. F. J., farmer, male, white, single, aged 21 years.

Family history: Good.

Previous history: Always had good health, a fine physique, no injuries.

Present trouble: Tuesday, July 1, became sick after dinner. Went to his work, but had such severe abdominal pain had to quit and come home. Attributed the pain to indiscretion in eating at a party attended the night before. Called physician for relief that night. Doctor gave purgatives and bowels moved. Wednesday, 2d, had a chill. Thursday and Friday, 3d and 4th, still suffering, but was out of bed and going about some. Friday he ate some and had more pain, so went to bed again. Quite sick all day Saturday, 5th. I saw him first Sunday, 6th, 10:00 A.M.—a robust, healthy specimen of manhood, lying in bed with his knees slightly flexed and without apparent suffering. Abdomen tympanitic and tender all over. More tender to the left of the median line. Diagnosis, appendicitis and perforation. Removed to hospital and operation 3:00 P.M. Found abdominal cavity full of bloody serum. All of the intestines discolored and especially the jejunum. Looked impossible to resect. Selected the mesentery that was hard and thrombosed and the bowel which was darkest and did resect 60 inches. He died in five hours. No recovery from shock.

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ESOPHAGEAL STENOSIS: A REVIEW.

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Esophageal stenosis may be either single or multiple, congenital or acquired. Congenital atresia is rare, and usually associated with other anatomical developmental errors. Acquired stenosis may be due to (a) injury from impaction of a foreign body, (b) ulceration secondary to infectious disease, *e.g.*, scarlet fever, diphtheria, syphilis, tuberculosis, typhoid fever, etc., (c) carcinoma involving the esophagus primarily or secondarily, (d) the swallowing of corrosives, and (rarely) hot liquids, (e) pressure from enlarged thyroids, neoplasms, aneurisms, etc., (f) the so-called spasmodic or hysterical contraction—including esophagospasm and "cardiospasm." The following types of esophageal stenosis have been described: (1) linear, (2) valvular, (3) annular, and (4) tubular.

The location of the stenosis largely depends upon the manner of its production, *e.g.*, (a) when due to corrosives, the most common site is opposite the cricoid cartilage, (b) when due to ulceration following infectious disease, the lower third is most frequently involved, (c) when due to a foreign body, stenosis occurs at the site of impaction, (d) spasmodic or hysterical contraction may apparently involve any portion of the esophageal lumen, (e) when present in "cardiospasm," constriction is usually noted at the esophago-gastric orifice, (f) when due to malignant disease, pressure from neoplasms involving other organs, aneurisms, etc., the location of the stenosis naturally depends upon the situation of the occluding lesion.

From a clinico-pathological standpoint, it has been customary to classify esophageal stenosis as (1) spasmodic, (2) cicatricial or organic, and (3) malignant. Under the classification of the older writers the word "spasmodic" was utilized to represent an esophageal contraction unaccompanied by any demonstrable pathological lesion, *i.e.*, as a purely nervous or reflex phenomenon, in which there was merely an apparent inability to permit the

passage of food through the esophagus, the pronounced nervous symptoms commonly prevailing in conjunction with supposed (or possibly real) disease inducing the reflex condition, the chief cause being excitement, fear, passion, or profound emotion! Certain more recent authors also agree that true esophagospasm is without pathological basis, thus in one hundred cases of esophageal stenosis, Downie (1912) found 24 per cent. spasmodic in character, and "believes that it is due to a motor neurosis pure and simple." He admits, however, that it may be aroused by some organic lesion, and states that the "spasm usually occurs at the cardia" (cardiospasm?).

It has long been recognized that contraction of the esophageal musculature may be induced by numerous pathological lesions, but under such circumstances, inasmuch as the stenosis owes its origin to a definitely demonstrable pathology, it would be properly classified as anatomic or organic, and not as nervous or spasmodic in character. Therefore the attempt of various authors to maintain the hypothesis that the terms esophagospasm and so-called cardiospasm can be correctly applied, when there exists a definite pathological basis for the stenosis, would appear distinctly fallacious.[1] In a recent article Plummer classifies "cardiospasm" as follows: (1) primary cardiospasm (Meltzer and Mikulicz), (2) primary atony of the musculature of the esophagus (Rosenheim), (3) the simultaneous development of cardiospasm and paralysis of the circular musculature of the esophagus brought about by degenerative changes in the vagi (Krause), (4) congenital disposition (Fleiner, Zenker, Sievers), (5) primary esophagitis (Martin), (6) kinking at the hiatus esophagi, (7) gross lesions of the esophagus or stomach, such as ulcer, carcinoma, etc., (8) congenital or acquired asthenia. Liebault considers that the first step in the production of cardiospasm is an erosion in the diaphragmatic portion of the esophagus, which may be due to alcoholism, excessive use of tobacco, too highly seasoned food, the "gulping" of large pieces of food, esophageal varices, etc. He contends that erosion once formed reflexly induces esophageal spasms which in turn prevent healing of the erosion—a process analogous to that observed in anal fissure. The erosion may be so small as to easily escape observation during esophagoscopy.

The word "cardiospasm" appears to have been originated as a substitute for "idiopathic esophageal dilatation unaccompanied by anatomical stenosis," *i.e.*, a spasmodic contraction at the esophago-gastric orifice temporarily preventing food from entering the stomach, occasionally accompanied by proximal esophageal dilatation. The term is now loosely employed to denote esophagospasm in any situation with or without dilatation, but specifically with reference to contraction at the esophago-gastric aperture. Whether dilatation when present is primary or secondary appears not to have been definitely determined; moreover, in many instances the so-called cardiospasm is unaccompanied by esophageal dilatation. Plummer admits that adoption of the term "cardiospasm" is premature and confusing, that the part it plays in the production of diffuse dilatation is by no means established, and there are many cases where spasm occurs at the esophago-gastric orifice without proximal dilatation.

Where esophageal stenosis is produced by causes other than spasm and pressure from neoplastic formations, the essential pathology is ulceration of the mucosa and submucosa, followed by necrosis and exfoliation, the healing process being necessarily accompanied by cicatrization and contraction. Cicatricial stenosis may develop subsequent to ulceration from any cause, the pathology in many respects being not unlike that due to necrosis from the action of corrosives. The resulting cicatrix from even superficial ulceration may produce marked stenosis, but the extent of the contraction usually corresponds to the area of denudation, and the type depends upon the character and amount of the damage inflicted. Cicatricial stenosis from the accidental or intentional ingestion of corrosive fluids represents the most common type.

The term "malignant" when applied to stenosis in any anatomical situation is incorrect, and when referring to the esophagus the expression should be stenosis produced by malignant disease, *i.e.*, the stenosis, *per se* can be neither malignant nor benign. Esophageal carcinoma may be either primary or secondary, the variety usually being epithelioma; sarcoma is almost unknown in this situation. Malignant disease of adjacent structures may involve the esophagus secondarily and produce stenosis. The pathology differs in no essential respect from that of malignant disease in other anatomical situations, and whether primary or secondary early stenosis may occur; the neoplasm may cause complete occlusion of the esophageal lumen with fatal termination.

The primary symptoms of esophageal stenosis are in some respects identical, regardless of the cause by which produced. There is noted gradually increasing dysphagia with regurgitation of

[1]The term "cardiospasm" seems strangely incongruous when applied to the esophagus, since its literal interpretation is "spasm of the heart"! The older designations esophagospasm and esophagismus appear more appropriate.

solid food, although in the earlier stages fluids apparently enter the stomach without difficulty. Pain may or may not be present over the stenosed area.

When due to corrosives the patient is usually observed before completion of cicatrization, and blood with shreds of exfoliated mucosa are commonly noted in the regurgitated material. The severity of the symptoms will depend somewhat upon the corrosive swallowed and the extent of the damage thus inflicted. In some instances the patient complains of intense burning pain beneath the sternum, there may be inordinate thirst, hemorrhage, and collapse. Portions of the eschar and bloody mucus have been regurgitated. In severe cases an immediate fatality may ensue from shock, hemorrhage, or perforation. In rare instances, however, the course may be prolonged, abscess formation, mediastinitis, pyopneumothorax, etc., occurring as complications or sequelae.

In stenosis from ulceration secondary to infectious disease, the symptoms are milder and less rapid in their progression. The patient may complain of difficulty in deglutition for weeks or months, and regurgitation of food for a time occurs only at intervals. The characteristic symptoms in all cases of esophageal stenosis due to infectious disease, and also in so-called spasmodic contraction, are dysphagia and the regurgitation of food.

Little need be said concerning the terminal symptomatology. In the event appropriate remedial measures be not instituted, the symptoms progressively increase in severity, all food is finally ejected because of inability to reach the stomach, the patient becomes rapidly emaciated, and death ensues from inanition, or perforation and collapse.

The diagnosis of esophageal stenosis from any cause presents no especial difficulty, but the exact type cannot always be determined upon consideration of the clinical signs alone. Where stenosis owes its origin to the ingestion of corrosives or foreign bodies, careful anamnestic and clinical investigation will usually develop the correct history. If the patient be observed early, inspection of the buccal cavity and fauces will reveal evidence of injury from the corrosive. Pain is an inconstant sign, and may therefore be misleading; intense thirst is sometimes noted. Nervous phenomena are usually prominent when stenosis is due to esophagospasm, and progressive dysphagia is present in every type. Dyspnea and dysphonia have been noted in stenosis due to pressure from aneurisms and neoplastic formations.

In stenosis from ulceration secondary to infectious disease, the clinical history is most important in connection with accuracy in diagnosis. In the majority of instances esophageal stenosis following infectious disease does not develop until convalescence is well established. Where there can be obtained no history of previous systemic infection, the swallowing of corrosives or foreign bodies, malignant disease involving either the esophagus or adjacent structures may be suspected.

Absolute verification of the clinical diagnosis has been made possible by development and perfection of esophagoscopic, radiographic, and fluoroscopic technic. Notwithstanding that the history and information obtained by clinical inquiry may seem sufficient to establish the diagnosis, radiography should be practiced in every instance where there exists difficulty in deglutition, and it is of the utmost importance that this be done prior to esophagoscopy or the introduction of esophageal bougies, to determine the presence or absence of malignant disease or an aneurismal tumor as a complication or causative factor.

The usefulness of the esophagoscope in the diagnosis of esophageal lesions suggested to Janeway and Green its applicability in gastric diseases, and upon examining a "large number of patients" with both esophageal and gastric lesions they detected disease of the stomach in fourteen. They were able to recognize "cardial carcinoma" in the early stage, and remove sections for microscopic examination. They prefer that examination be made under local anesthesia.

According to Sippy, the symptomatology and diagnosis of esophageal stenosis are important, as grave mistakes have occurred, the difficulty being attributed to gastric disease, and in some cases gastro-enterostomy has been unnecessarily performed. If the symptoms suggest no contra-indication, a soft stomach tube should first be used to locate the site of obstruction. The presence of carcinoma should not be assumed without consideration of other causes of stenosis—extra-esophageal, such as aneurisms, tumors, spondylitis, pericardial effusion, diverticulum; or intra-esophageal, such as tumor, cicatrix, spasm, diverticulum, and foreign bodies. The diagnosis of carcinoma is indicated by the course of the lesion, the presence of blood in the feces, characteristic odor upon passage of the stomach tube, the location of the lesion (50 per cent. near the esophago-gastric orifice, 40 per cent. opposite the tracheal bifurcation, and only 10 per cent. in upper portion of esophagus), and finally the appearance as revealed by the esophagoscope. Diverticula occurring in the upper portion may cause tumor of the neck; in the lower section they may be detected by the introduction of bougies, the

nature of the contents, and by radiography after ingestion of bismuth. "Cardiospasm" is usually diagnosed by the fact that while the obstruction is impervious to food, even liquids, it yields to the pressure of a tube or bougie.

As Liebault wisely suggests, the older methods of investigation in these cases, *i.e.*, auscultation and catheterization, should be supplemented by radiography and esophagoscopy. However, radiography may lead to a mistaken diagnosis in esophageal stenosis unless the operator remembers that in normal subjects the bismuth may remain practically stationary for some time in the diaphragmatic region. This is explained by the physiological constriction which exists at that point.

Seelig describes a case in which differential diagnosis was uncertain, as between hysteria, esophageal stenosis, and diverticulum. Tests were made with bismuth emulsion, introduction of bougies, and finally by having the child swallow a fine gold chain two feet long. A subsequent radiograph showed the chain extending downward from the first cervical vertebra, terminating in a cavity to the left of the mid-line. External esophagotomy revealed marked stenosis in addition to the diverticulum.

The fact, says Lange, that organic and spasmodic esophageal stenosis may exist simultaneously, and that in neurotics, in valvular cardiac disease, and in mediastinal tumor, the introduction of stomach tubes and bougies may be distinctly dangerous, establishes the value of radiographic methods of examination. He suggests giving the patient first a small bismuth capsule, second a large bismuth capsule, third several swallows of bismuth mush; radiographic study during deglutition will immediately reveal any obstruction; the size and extent of the stenosis and whether organic or spasmodic can also be determined; deficient peristalsis will be shown by arrest of the bismuth capsule, thus rendering early diagnosis possible—before the stomach tube encounters resistance, and even before marked dysphagia is present. Increased mediastinal pressure may also be early recognized by arrest of the bismuth capsule in the esophageal lumen.

The absolute necessity of employing modern mechanical diagnostic aids cannot be too strongly emphasized, as they render possible the accurate determination as to location and character of the stenosis, and whether it be single or multiple. After filling the esophagus with bismuth mixture, provided the tube be not impervious, which rarely occurs, immediate radiography will reveal the site and also the extent and character of the lesion.

Direct visual inspection by the esophagoscope is also distinctly advantageous, and esophageal bougies afford information as to location and caliber of the stenosis; but, for the reasons already noted, the use of these instruments should be preceded by radiography. It must also be remembered that multiple stenoses may not be revealed by either the esophagoscope or bougie, until the one situated most proximal has been dilated, because of the impossibility of introducing these instruments beyond the first constriction. Mosher wisely suggests, in this connection, that esophagoscopy is not without dangers, chief among which are (a) rupture of an aneurism, (b) perforation of the esophagus, and (c) sloughing of the esophageal walls from pressure of the instrument. The first danger should be easily avoided, as esophagoscopy should not be undertaken if an aneurism be suspected; rupture should never occur, because the instrument should not be advanced unless patulous esophageal lumen is visible in front; sloughing from pressure is most likely to occur when the esophageal lumen is narrow opposite the cricoid cartilage, and this may be avoided by using a smaller instrument. In employing the esophageal bougie for either diagnosis or dilatation, the fact must not be forgotten that its introduction may be attended by dangers, necropsy having shown that perforation of the ulcerated and friable esophageal walls has in several instances been thus produced.

The indications for treatment and the methods most appropriate will depend upon the location, extent and cause of the stenosis. In the early stages of so-called spasmodic contraction (esophagospasm—"cardiospasm"), no local treatment may be required, as in certain cases the symptoms disappear following systemic medication directed toward restoration of normal physical and nervous equilibrium. However, where nervous phenomena are accompanied by actual anatomical constriction of the esophageal lumen, dilatation or some other suitable plan of treatment must be employed. The methods of examination already outlined will usually be sufficient to determine whether or not stenosis actually exists at any point within the esophageal lumen. In numerous instances of so-called spasmodic contraction recorded in the literature of the last few years—in some of which there was claimed to be a "valvular" constriction at the esophago-gastric orifice—dysphagia subsided following systemic treatment, supplemented by introduction of bougies for the psychic effect.[2]

[2]There normally exists no anatomical valve at the esophago-gastric orifice, nor is there any distinct sphincteric action of the esophageal musculatur in this situation. There is, however, a sphincter-like action at the hiatus esophagi due to arrangement of the diaphragmatic musculature which encircles the aperture. These anatomic facts have been accorded insufficient attention by previous writers.

The literature contains the records of several hundred cases of so-called cardiospasm, the majority of them reported since adoption of this term a few years ago. Plummer mentions nearly one hundred and fifty personally observed instances, in ninety-one of which there was diffuse dilatation of the esophagus without anatomic stenosis—"cardiospasm." In the majority of cases a cure is said to have been effected by dilating the esophago-gastric orifice by hydrostatic pressure according to the method usually accredited to Plummer (1908), but originally suggested by Russell (1898), further elaborated by Pyle in 1900, and later by Schroeder.

Meyer records a case of "impermeable cardiospasm" treated by thoractomy and esophago-plication. After preliminary gastrostomy attempts at dilatation through this opening were unsuccessful. Under positive differential pressure the lung was exposed and pushed away from the mediastinum, diaphragm, and aorta. A large sac was found above the esophago-gastric orifice. The overlying pleura was divided, the pneumogastric nerves separated from the esophagus, and double esophago-plication performed, care being taken not to penetrate the esophageal wall nor to include the pneumogastric nerves. The esophagus was replaced and the wound closed. The patient was able to swallow solid food in a month, and progressively improved until all symptoms subsided.

Where stenosis is due to malignant disease, involving either the esophagus or adjacent structures, marked prolongation of life cannot be definitely promised from any method of treatment. Mediastinal carcinoma is one of the most rapidly fatal lesions afflicting the human being. Where malignant disease is primary and confined to the esophagus, partial esophagectomy may sometimes be justifiable, but the results following the operation have not thus far been very encouraging. Where a portion of the esophagus is surgically extirpated, a series of plastic operations may become necessary for restoration of its lumen, and the patient usually succumbs from extension of the disease before the desired anatomical result has been attained. It is doubtful whether esophagectomy should ever be undertaken for attempted cure of stenosis due to carcinoma, unless the disease is strictly confined to the esophagus and the diagnosis can be perfected in the earliest stage, and even then the life of the patient may not be materially prolonged by the operation. Preliminary gastrostomy is always required to afford a means of nourishing the patient while the esophagus is temporarily out of commission. Dilatation of an esophageal stenosis due to malignant disease is absolutely contra-indicated, because of the danger of rupturing the weakened and friable esophageal walls, and thus hastening a fatal termination.

In contradistinction to the foregoing, some wonderful results have been reported from partial esophagectomy for carcinoma. Lane restored the continuity of the upper esophagus with a tube constructed from a strip of skin from the neck, retaining an attachment for blood supply, which was severed after union. The patient was fed through a tube until union was secure. Subsequent necropsy revealed recurrence of the carcinoma in the left side of the neck. The implanted skin-tube did not differ in appearance from the normal esophagus. The operation demonstrated the feasibility of substituting skin to repair the defect, provided the portion removed be not in too close proximity to the larynx (Lane).

Torek records what he claims was the first successful resection of the thoracic portion of the esophagus for carcinoma (March 14, 1913), gastrostomy having been performed previously. Anesthesia by tracheal insufflation according to the Meltzer-Auer method; incision through whole length of seventh intercostal space from posterior end of which incision extended upward through angles of seventh, sixth, fifth and fourth ribs; pneumogastric nerves carefully separated by dissection. Pulse never wavered, no vagus collapse. Difficulty in dissecting that portion of the esophagus which passes behind aortic arch overcome by ligating thoracic branches of aorta and lifting it forward; to avoid leakage from upper esophageal stump, esophagus eliminated from pleural cavity altogether by dissecting from attachments upward to neck and bringing it through incision at anterior border of left sterno-cleido-mastoid muscle. Thorax closed without drainage; patient made good recovery. "In the light of the success which attended this new method of attacking the disease, it becomes our evident duty to advise operation at once, and thus we shall have the satisfaction of saving the lives of many who otherwise would have been doomed to succumb to their affliction" (Torek).[3]

Lexer used skin flaps in reconstructing the cervical portion of the esophagus and intestine for the remainder, and cites two cases in which healing promptly occurred, deglutition thereafter being perfect. He next endeavored to form the entire esophagus from skin flaps dissected free and rolled into a tube the size of a finger; the skin of the chest was undermined so it could be united over the tube

[3]A similar operation was performed by Zaaijer January 9, 1913, or two months prior to the one reported by Torek. In Zaaijer's case the carcinoma involved the lower portion of the esophagus. The patient recovered. This is the first resection of the esophagus for carcinoma, and Torek's is the second (Meyer).

which was sutured to the stomach a month later. Perfect anastomosis resulted, but unfortunately, the carcinoma recurred before esophago-pharyngeal anastomosis could be effected. In another instance a loop of jejunum was used to replace the esophagus with successful result.

Meyer reviews the following operative procedures for esophageal carcinoma: (1) esophagoplasty by means of skin-plasty (Bircher, 1894), (2) inferior esophagoplasty with the help of a totally excluded coil of jejunum (Wullstein, 1904-1908, Roux, 1902), (3) inferior esophagoplasty with the help of the totally excluded transverse colon (Kelling, 1913, Vulliet, 1911), (4) inferior esophagoplasty with the help of a dissected portion of the major curvature of the stomach (Jianu, 1912). He believes the Jianu operation has to some extent revolutionized esophageal surgery for malignant disease, and where diagnosis can be perfected and operation performed early, surgeons are justified in advising radical intervention. He advocates the Jianu procedure and reports one successful operation. A portion of the major curvature of the stomach is dissected and formed into a tube, the lower end remaining connected, the upper end being free, which is used for reconstructing the esophagus. If carcinoma be located above, behind, or just below the aortic arch, the tube is drawn upward extra-thoracically below the skin or pectoral muscle to a point near the mammary gland (Jianu), and at the second seance (after resection) the oral end of the esophagus having also been transposed extra-thoracically (v. Mikulicz, Kelling, Ach.), the connection between the mouth and stomach can be completely restored, either directly by end-to-end suture, or by a subsequent plastic operation—extra-thoracic esophagoplasty. Where carcinoma is located in lower third of esophagus, the tube is transposed intra-thoracically through the esophageal foramen "alongside the cardia" and connected with the undisturbed oral end of the esophagus by end-to-end suture—intra-thoracic esophagoplasty (Meyer).

In cicatricial stenosis from ingestion of corrosives or foreign bodies, also ulceration secondary to infectious disease, the treatment *par excellence* is progressive dilatation, either with or without preliminary gastrostomy as may be required by the conditions present. Divers and sundry methods of accomplishing dilatation have from time to time been devised and practiced, all of which doubtless have their indications, contra-indications, and limitations. The oldest and most common practice is dilatation by frequent introduction of olive-pointed bougies, the size being gradually increased until the normal esophageal caliber has been restored.

Prior to present perfection in the technic of esophagoscopic and radiographic diagnosis, the treatment of esophageal stenosis was most unsatisfactory, verification as to the extent and character of the lesion being impossible. While these modern mechanical methods of diagnostic precision have suggested remedial measures which can be instituted under actual visual inspection and with the assurance of accuracy in their technical application, dilatation remains the method of choice, although in the treatment of cicatricial stenosis division by the esophagotome has been advocated and successfully practiced by various surgeons. After dividing the stenosed area with the esaphagotome dilatation is required to maintain patency of the esophageal lumen. The "string-cutting" method of Abbe is too familiar to require description. It may be advantageously employed under certain circumstances.

Since the most appropriate and least dangerous plan of treatment is progressive dilatation, the question naturally arises, what method shall be employed? The use of graduated bougies has already been mentioned. As an improvement upon older methods of accomplishing dilatation, Russell (1898) devised what he called a "silk-covered rubber balloon," to be distended by internal pressure after introduction into the esophagus, and reported a series of cases successfully treated by his method. These were probably "cardiospasm," as the author mentions "dilating the cardia" by means of his apparatus.

Two years later Pyle (1900) described a somewhat similar method, his device consisting of a tube composed of rubber and silk the size of a No. 12 (male) catheter, a piano wire guide bearing an olive point, two tissue-rubber digital-shaped sacs, one very fine digital-shaped silk sac, and a force-pump, "including the necessary trimmings." The wire guide is placed in the rubber tubing and the proximal end secured by metal used for connecting the tube to the force-pump. The delicate rubber and silk sacs are fastened to the rubber tube by strong linen thread. The olive-pointed guide is used to carry the sac through the stenosed area. When once engaged warm water is forced into the sac by means of the pump. Above and below the stenosis the sac expands to the limit of the silk covering, the stenosis causing it to assume an hour-glass shape. If additional water be forced into the dilator, the entire pressure is exerted upon the contracted portion, compelling the stenosed area to yield to the internal pressure. Graduated sizes may be used. Pyle reports a case of esophageal stenosis

following typhoid fever successfully treated by his method.

The instrument and method of procedure suggested by Schroeder (May, 1908) is interesting in this connection: Having located the site of the obstruction with the olive-tipped bougie, a stomach-tube of proper size is passed to the obstruction. The tube has an opening only at its lower end and no lateral fenestrae. At its middle is inserted a bulb. The tube is now filled with water, raised, and its upper end compressed with the fingers. Firm, even, continued pressure is now made on the bulb by the operator. A column of water is thus pressed against the obstructing tissue. If the obstruction is purely spasmodic, it will suddenly relax and the water is felt to pass from the tube, which follows instantly and easily. If the obstruction is organic and incomplete, the water will gradually pass, by this method, through the obstructed portion, but the tube does not follow. A similar result will follow if the obstruction is partial from organic cause, but is made complete by a spasm. The safety of this procedure lies in that before the esophagus can be injured or ruptured in the presence of an unyielding obstruction, the water will return along the side of the tube. In compression from an unsuspected aneurism the danger of perforation will also be lessened (Schroeder).

A few months afterward Plummer (August, 1908) further elaborated the method of dilatation by hydrostatic pressure, and devised the instrument known as the "Plummer dilator." The instrument consists of one rubber tube leading from a water tap to the indicator arranged like a steam gauge, which registers the pressure of the column of water; the second tube leads from the dilator to a "T"; the third tube leads from this "T" and is used to press upon with the fingers as water passes to the indicator and to regulate pressure in the dilator; the fourth tube leading also from this "T" is attached to the dilator, which consists of a flexible staff passed through a hollow tube of rubber. At the lower end of this tube a number of holes are made, and at the end of the flexible staff there are threads for attaching graduated olive tips as required. Over the lower end of this tube containing the holes is a small rubber bag four or five inches long; covering this rubber bag is a silk bag, and over this another thinner rubber bag. The object of the silk bag is to insure uniform pressure from the water. When turned into the tube the water distends the bag, and if not secured by silk it would dilate upon each side without actually dilating the stenosed area. When distended the bag resembles a sausage, being about an inch in diameter and five to six inches long. While according to my understanding the Plummer instrument was devised expressly for the treatment of "cardiospasm," *i.e.*, for dilating the esophago-gastric orifice, there seems no good reason why it might not be satisfactorily employed in selected cases of uncomplicated stenosis involving other portions of the esophagus, provided requisite care be exercised in its application. However, in extensive or complicated organic stenosis with marked tortuosity of the esophageal lumen, it is doubtful whether the Plummer dilator could be successfully employed, and in stenosis due to malignant disease its use would certainly be contra-indicated.

According to Plummer and other writers, the adaptation of Mixter's method of using a silk thread as a guide has proved of inestimable value in the treatment of esophageal stricture by dilatation. The patient swallows six yards of silk thread; this passes down through a sufficient number of coils of intestine to prevent its withdrawal on being pulled taut. "With the whalebone staff and olive passed on a silk thread we may locate pockets, determine their depth, measure the diameter of strictures, divulse them, and estimate the rigidity of the esophageal wall at the site of narrowing." Only sufficient force to detect obstruction is permissible in advancing an unguided esophageal sound. With a silk thread that degree of force may be used which is short of carrying the thread out of its course and through the esophageal wall, or of endangering the esophagus by longitudinal traction, or of splitting the esophagus by a dilating wedge. If sufficient obstruction is encountered to make it seem possible that the thread might be carried out of its course, a piano wire should be first passed on the thread and the olive passed on the wire. With the wire in place the possibility of introducing a sound is assured. When passing an olive on the wire, tension on the thread should be maintained to avoid any possibility of the tip of the wire penetrating the wall of the stomach or esophagus. Various sizes of piano wire may be used and its flexibility further varied by the amount of wire exposed (Plummer). It is claimed that by the early utilization of this procedure, dilatation can be accomplished from above, the necessity of preliminary gastrostomy being thus avoided.

Where esophageal stenosis cannot be dilated from above or below, Rikitzky recommends a plastic operation, and reports a case in which the esophagus was exposed, opened above and below the stenosis, and the cicatrix excised, the resulting defect being repaired with an inverted skin flap. A tube previously introduced into the esophagus was retained

in situ by strings through the nose and gastric fistula. The flap was subsequently divided from its pedicle, the wound healed, and the gastric fistula was allowed to close. "The patient was able to swallow all kinds of food, and was perfectly well when discharged. The rapid repair of the esophageal wound may be attributed to the preliminary gastrostomy; this operation would seem to be indicated as a preliminary measure in all operations in which portions of the esophagus are to be excised."

In two cases where stenosis occurred near the esophago-gastric orifice, Maffei adopted more radical measures. The esophagus was exposed by thoracotomy and numerous adhesions to the pleura were found. After these were freed a sound could be passed into the stomach. Convalescence in the first case was complicated by an empyema; in the second the wound had healed by the twelfth day; both patients were fed by the mouth after operation, and the gastric fistulae closed spontaneously.

Where stenosis involves the entire circumference of the esophagus, Jackson recommends the string-cutting method of Abbe modified for use with the esophagoscope, so that the surgeon can work from above and thus obviate the necessity of a gastrostomy. The operation is performed by a "string-cutting esophagotome," supplemented by a "dilating esophagotome." He claims this method is useful when the opening can be found, but in the majority of long-standing cases a dilatation or diverticulum exists above the stenosis, and it is frequently impossible to locate the opening. In such cases, however, the esophagoscope serves as a speculum, and obviates the danger of operating blindly.

On the contrary, Eastman believes that in benign stenosis of the esophagus, gastrostomy is advisable not only to provide a means of maintaining nutrition while the lesion is undergoing treatment, but also as an avenue for retrograde dilatation, for the practice of Abbe's string-saw, or Ochsner's double catheter methods. So long as semi-solid or even a portion of solid food can be swallowed, dilatation or tubage should be practiced; but when the patient can only swallow liquids, Eastman thinks "we are slavishly following the teachings of pre-aseptic days if we do not resort at once to gastrostomy, not only because of its indirect usefulness, but also because of its curative value *per se*."

In discussing Rosenheim's report of a successful dilatation of diphtheritic stenosis of the esophagus, Ewald referred to a peculiar observation of his in dealing with benign stenoses, viz., that the cicatricial type, for which gastrostomy had been performed, nearly always improved after the gastric opening had been provided for the introduction of food, the stenosis gradually developing a larger caliber without other treatment. Dunn also advocates gastrostomy in all cicatricial stenoses, and reports three severe cases, one following typhoid ulceration, and two from the ingestion of concentrated lye. Repeated attempts had failed to reach the stomach through the mouth. Complete cure followed gastrostomy with retrograde dilatation with a modification of Dunham's wire and spindle bougies.

By dilating or cutting, Guisez was able to cure twenty-three out of twenty-eight serious cases of impassable esophageal stenosis. The results were better the more recent the development of stenosis, and the short, valve-like lesions responded most readily; multiplicity of the stenoses was no obstacle to final success, each being treated in turn. Long lesions with longitudinal infiltration were the most difficult to cure as the contraction displayed a great tendency to recur. He prefers to use the esophagoscope in passage of the sound. The instrument is left in place a few hours, and the size gradually increased until the stenosed area is fully dilated. This measure was effective in forty-four out of fifty-four cases; in the remaining ten it was necessary to resort to gastrostomy.

In stenosis of the cervical portion of the esophagus, Lerche advises dilatation with or without division. After full dilatation is accomplished the largest bougie is introduced at intervals and left in situ for ten minutes in children and fifteen to thirty minutes in adults. If the stenosis is resistant the esophagoscope will determine its length and position; the knife is then introduced and the necessary number of incisions made. In children, 1 to 1.5 mm. blades, and in adults, 2 to 3 mm. blades should be used. Multiple lesions can be successfully treated by the esophagotome, and he emphasizes the fact that the cutting of the stenosed area must be done under guidance of the eye, *i.e.*, through the esophagoscope. He does not consider gastrostomy justifiable, either for purpose of feeding or for retrograde dilatation, until his method of treatment has been tried.

In several instances of cicatricial stenosis observed by Gross and Sencert, progressive dilatation proved successful under direct visual control by means of the esophagoscope. In two others stenosis was finally cured by introducing laminaria tents progressively increasing their size. In two others linear electrolysis relieved impermeable stenosis. In one case dilatation was attempted without endoscopy and fatal perforation resulted. Where direct intervention appears dangerous, gastrostomy with retrograde dilatation is advised.

According to Fischer, the esophageal lumen may

finally become impassable even to a string, and in a case of this description he resorted to a rather formidable procedure, viz., "transthoracic cardiotomy," the patient dying twenty-four hours thereafter from pulmonary congestion. He does not hesitate to recommend the operation as appropriate where otherwise the patient would be subjected to life-long feeding through a gastric fistula. The operation was performed upon a boy of three years under Meltzer-Auer continuous insufflation for an impassable stenosis beginning at the tracheal bifurcation and ending 1.5 cm. above the diaphragm. After pushing the well-distended lung away from the diaphragm through incisions in the seventh and eighth intercostal spaces, the esophagus was exposed and dissected free; traction was then made by a loop of gauze and forceps pushed through the layer of diaphragmatic pleura and peritoneum, and the peritoneal cavity opened; the stomach was carefully pulled into the thoracic cavity until a point was reached about 7cm. below the esophago-gastric orifice; the pleural cavity was "packed off" with silk hankerchiefs; the stomach was incised 3 cm. below the esophageal opening and a urethral catheter passed through the stenosed area and outward through the mouth; long dressing forceps now inserted into gastrostomy opening (made at a previous operation), and lower end of catheter pulled through the gastric fistula; gastric incision sutured; esophagus fastened to diaphragmatic ring, and thoracic wounds closed.

My personal experience with esophageal stenosis is limited to two cases, each of which followed a prolonged attack of typhoid fever.

The first patient was a male of 17 brought to me by Dr. George R. Simpson, of Breeding, Kentucky, November 7, 1906. He had just recovered from an attack of typhoid fever of three months' duration. The first evidence of stenosis was discovered in the tenth week of the fever, and difficulty in swallowing had gradually but steadily increased for four weeks, when he was brought to Louisville for treatment.

When I saw the patient he was greatly emaciated and feeble. He could swallow only liquids in small quantity and very slowly. I succeeded at first in passing a No. 21 soft bougie. The constriction was near the esophago-gastric orifice. By gradual dilatation I was enabled, at the end of two weeks, to pass a No. 41. This size was used every other day for two weeks, when the patient having been taught to use it himself, was permitted to return home with instructions to continue the treatment for at least two months. Soon after beginning use of the No. 41 bougie, the patient was able to swallow well-masticated solid food, and his general improvement was rapid. In a letter dated February 1, 1915, Dr. H. B. Simpson, son of the physician who brought the patient to me, states that the man is now a strong, healthy farmer, and has no trouble whatever with his esophagus.

In his letter Dr. Simpson mentions a case of esophageal stenosis in a child of four years following diphtheria, which occurred in his practice last year. This lesion was also near the lower end of the esophagus. He treated it by gradual dilatation, which he had seen practiced in my first case. It was necessary, however, in this instance to anesthetize the patient. The child made a complete recovery.

In January, 1907, the second patient came to me from Eastern Kentucky. A man 30 years of age had been ill with typhoid fever for three months, and noticed difficulty in swallowing when he first began taking solid food several days after subsidence of the fever. The difficulty steadily increased and when I saw him about four months after the first evidence of stenosis was noted, he could scarcely swallow liquids, and his physician had been trying to nourish him by enemata. He was decidedly the most emaciated person I had ever seen.

Failing to pass even the smallest bougie, I advised gastrostomy with the view of dilating the stenosis from below and also for the purpose of nourishing the patient. This was declined, and the patient returned to his home. I never heard from him after he left the hospital.

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TONSILLECTOMY: THE FORWARD INCLINED SITTING POSTURE UNDER N_2O-O ANESTHESIA AND OTHER NEW FEATURES.

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Through recent investigation the tonsil, as a source of systemic infection, has become even more prominent than heretofore. The character of these infections and the permanent damage done by them to the heart and many other structures demand a most perfect operation to prevent a continuation of the infective process through this avenue.

The question of the effect of tonsil operations upon the voice, both speaking and singing, is one which is constantly met and which merits more consideration than we can give it here. No less an authority than Lennox Brown says that as a rule "nothing but ultimate good to the voice can follow from this operation in suitable cases." Semon and Watson Williams declare that "removal of tonsils never impair the voice." On the other hand, Lack believes that there is a risk to the voice, especially in adults. Bethi warns against the removal of singers' tonsils, and D. Hudson Makuen advises splitting the tonsil horizontally, leaving the lower lobe to act as a separator of the anterior and posterior pillars, thus preserving a freer muscular action in voice production.

Our own experience is that the voice in two classes of patients is *benefited* by a clean tonsillectomy: first, those with enormously large tonsils which elevate the soft palate toward the posterior-pharyngeal wall, thus narrowing the naso-phrayngeal opening and thereby diminishing the nasal resonance; and second, those with small tonsils which are adherent to the muscles from old peri-tonsillar or other inflammations. Improvement in voice varies from an increased resonance and quality, with greater ease and more endurance, to an actual increase of one or two notes in the upper tone register in singers.

Voices have been impaired by tonsil operations, but it is doubtful that the sacrifice of the tonsil itself should be held responsible. It follows rather, a tonsillotomy in which a portion of the tonsil is left, and contractions or adhesions between the remnant and the faucial pillars limit the action of the muscles. Voices are very materially injured or ruined by unnecessary laceration of the pharyngeal and palateal muscles. In these cases the *operation* receives the blame, when a poor technic or none at all is probably responsible.

In the early years of child life the tonsils are subjected to a vast amount of infective material in the form of ordinary dirt as well as those diseases having tonsillary manifestations, such as scarlatina, measles, diphtheria, influenza, etc.

If the tonsil through the early months and years protects the child without itself becoming diseased, it should not be removed. But if it becomes damaged and thereby not only fails to protect but becomes a source of infection, which at any time may find its way into the blood stream, causing heart disease from which the patient may never completely recover, or rheumatism with its unhappy consequences, tuberculosis, etc., there is one proper treatment—*complete* removal in the capsule. Occasionally tonsils are so large that excision is warranted without other definite pathology.

Contrary to the general impression, the large protruding tonsil is more nearly normal than most tonsils which are submerged and difficult to see. The large projecting tonsil usually drains well, since its crypts open freely into the pharynx. But the submerged tonsil drains poorly because its crypts are covered by plica-tonsillaris, or adhesions where decomposition and inflammation are sure to take place and become a possible focus of infection.

The examination: A careful examination of the crypts will reveal whether or not the tonsil is diseased. This necessitates an inspection of the tonsil from all sides. A submerged tonsil is often difficult or impossible to examine, unless lifted out of its concealment. If the tonsils are wholly or partially degenerated and contain cavities or broken down follicles, giving evidence of inflammation and poor drainage, tonsillectomy is indicated. To accomplish this in the safest, surest, most thorough and rapid manner, with a minimum of after-effects, and with the shortest period of convalescence, should be our highest aim.

In looking up the technic in our latest text-books we find Ballenger lauding the Sluder guillotine in one sentence and in another describing it as unsuitable for the submerged or firmly adherent tonsils following quinzy, for severe anginas, and, in thin tonsils, or tonsil stumps. These tonsils need a thorough operation most.

The great advantages of the simple snare are the ease and certainty with which the flexible wire loop sweeps through the sinus tonsillaris following the capsule, when properly applied, and the protection of the surrounding structures from injury.

The greatest danger in tonsil operations as ordinarily performed are: first, the anesthetic; and second, hemorrhage. It is doubtful if the anesthetic should be given first place as a danger factor. The recumbent position which has been and is still the position most commonly employed, subjects the patient in a tonsil operation to the danger of drowning or suffocation from the hemorrhage, which in some cases has been attributed to the anesthetic. When local anesthesia is used, secondary hemorrhage is to be dreaded.

We are firmly convinced that the facts as given above constitutes the *bête noir* of throat work and that the only solution of the whole problem is a technic which includes the forward inclined sitting posture with general anesthesia for both child and adult. This position is admittedly the one of choice since, among other reasons, the structures are in their normal positions as examined previous to operation, and it is the only position in which blood may be kept from entering the trachea. Many operators prefer local anesthesia in adults, with its many disagreeable features, both for the operator and the patient, solely because of the erect posture. These same surgeons must, however, use a general anesthetic for their little patients.

The general anesthetic most commonly used is ether, which for this work has but little to recommend it. It is the most disagreeable anesthetic known from the standpoint of the patient; its odor and slow induction stimulates the child's tendency to cry and struggle; the memory of these two or three minutes are like a nightmare and childhood is gone before it is forgotten. Then, after the operation is over, the usual post-operative ether vomiting (often attributed to the swallowing of blood) not only renders the patient uncomfortable, but becomes an active factor in exciting post-operative hemorrhage.

From the standpoint of the surgeon, ether, when administered by the open drop method, interrupts the operation and fosters a tendency to overdose the patient in an effort to lengthen the operative periods. It stimulates the flow of mucus in a large percentage of cases which, together with the blood, may be churned into a froth when the patient is in the recumbent posture or any of its usual modifications. This froth when inspired into the smaller branches of the bronchial tree is quite impossible to dislodge; then, only heroic measures with an abundant supply of oxygen will save the patient from asphyxiation.

We have selected nitrous oxid-oxygen as our general anesthetic, because it is especially adapted to intra-oral work in the sitting posture. Over a most extended use in dental practice, which is nearly identical in its requirements with tonsil operations, it has proven itself beyond any doubt to be the *safest* anesthetic.

When compared with ether it induces anesthesia without odor or excitement so quickly that the patient is under before they realize it; there is no interruption of the operation, since it is administered through the nasal inhaler under sufficient pressure to supply the respirations without any air entering through the open mouth; there is never a noticeable amount of mucus secreted; post-operative vomiting is very rare and *never* protracted; the patient regains complete consciousness within five minutes and is able to co-operate with the nurse; water may be taken at once *ad libatum,* since ether is never needed or used with the technic to be described.

While the technic of administering the two gases is not difficult to attain, nevertheless, a thorough knowledge of the signs of this anesthesia and some instructions by an expert in it is quite important in obtaining good results at once. The cost of the gases depends upon the size tanks in which it is bought, but we use about $1.00 worth to a case.

Technic: Added to the usual preparation of the patient for operation in children of robust build, or excitable nature, we administer an hour before operation 1/10 to 1/8 of a grain of morphine with hyoscin 1/300 to 1/200 of a grain. For adults, the dose may be increased to the full tablet containing morphine 1/4 of a grain, hyoscin 1/100. Children under ten receive no hypnotic. Our object in using the hypnotic is to secure a more tranquil, care-free state of mind in the patient just before the time of operation, to widen the margin of anesthesia, and to relieve pain immediately following the operation and recovery of consciousness.

The patient is placed in an especially designed chair, which is adjustable for all sizes of patients, having no arm or foot rest. The seat of the chair is brought 2½ to 3 feet from the floor, the back of the chair is then brought *forward beyond* the vertical meridian, and the head rest still further forward so that the oral axis is pointed downward toward the floor at an angle of 120 degrees, or about the reading posture. The patient's body is, therefore, inclined forward, the chin down near the chest and the feet clear of the floor. The patient's position is thus maintained by a series of straps passing about the ankles, the pelvis, and the shoulders. These straps are always adjusted before beginning anesthesia. It is of extreme importance to retain

the shoulders against the back of the chair so that the head rest may accomplish the very important work of declining the chin; this we accomplish by a figure-of-eight strap passing under the arms, over the shoulders, and crossing back of the chair, thus maintaining firm pressure. This position aids respiration by holding the shoulders back.

The operator lowers his stool to the point where his visual line corresponds to the axis of the oral cavity, so that when he looks into the patient's throat his line of vision is directed well upward. Any blood will now run forward out of the mouth even from the adenoid area.

The Klar headlight with the Tungsten lamp and battery in pocket is employed so that the light is

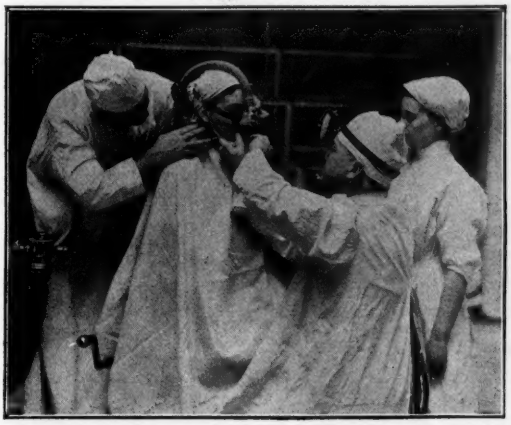

Fig. 1. Showing position of the patient, nasal inhaler in position, the second step in the operation.

constant and no cords to interfere. Sufficient daylight is admitted on the patient's left or right to permit the anesthetist to note the changes in color as *an aid* in determining depth of anesthesia.

The usual sterile sheets and towels cover the patient.

The nasal inhaler is now applied with elastic bands about the head to hold it in position; the breathing tube leading to the gas-oxygen apparatus behind the chair is connected to the inhaler, and the patient is instructed to keep the mouth closed while the gases are inhaled. Anesthesia is obtained by administering pure nitrous oxid during the first twelve breaths, but *before* consciousness is quite lost, about the eighth breath, the patient is commanded to open his mouth, when a Whitehead gag is inserted, and the mouth covered with eight or ten layers of gauze to prevent the inhalation of air while the anesthesia is carried to its required depth.

After the first twelve breaths, sufficient oxygen is now mixed with the nitrous oxid to prevent deep cyanosis, twitching, dilated pupils, etc., the signs of anoxemia. When the patient is fully anesthetized, which is evident from the character of the respiration, sluggish pupillary reflex, absence of winking when stroking the lashes or touching the conjunctiva with a *clean finger* (all usually associated with a rose color of the skin), the pressure in the gas bags is increased by tightening the pressure screw on the apparatus. The gauze is now removed from over the mouth, and the exhaling valve on the nasal inhaler screwed down so that the gases enter so rapidly through the nose and through the mouth-hook, now placed in the corner of the mouth, that inhalation of air through the open mouth is impossible. Through the remaining period of anesthesia this constant flow of gases is maintained, varying the mixture of oxygen and nitrous oxid according to the signs exhibited by the patient. Up to this moment we have occupied from one to two minutes when the operation may proceed.

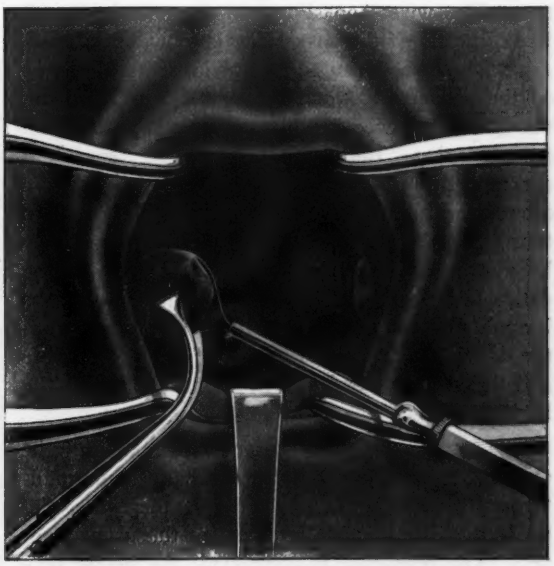

Fig. 2. Applying snare (reverse of the usual method), showing the sweep of the wire loop around the tonsil, utilizing the spring of the No. 7 wire in keeping the loop hugging the capsule.

The following method of attack is not varied and is methodically carried out in each case, whether the tonsils are free or submerged, large or small, firm or necrotic:

The tongue is depressed with the tongue depressor in the left hand and a tenaculum is applied to the right tonsil and locked. Still holding the tenaculum in the right hand, the assistant exchanges the dull curved dissector for the tongue depressor in the left hand; with this the mucous membrane between the anterior pillar and the tonsil is broken vertically

far enough to admit the tip of the right index finger. The operator now takes the tenaculum in his left hand and elevating the wrist reaches the right hand under the left wrist, inserts the *right* index finger into the opening made by the dissector, pushes the finger into, and sweeps the tonsil fossa, completely separating the capsule from the pharyngeal muscle upon which it lies. The snare of the Brown type with a No. 7 piano wire only (no guard over it) is passed over the handle of the tenaculum with the end of the wire loop to the patient's *right*, the snare handle itself being to the *median* line of the tenaculum. The wire loop slips into the *anterior* tonsil fossa, the tip of the snare tube is crowded into the *posterior* fossa, when the snare is tightened down on the pedicle, *but not severing it.* The adjusting nut is now screwed down to prevent the wire loop from opening. Both the snare and the tenaculum are now dropped into the corner of the patient's mouth and allowed to remain there until the other tonsil is prepared in precisely the same way, only by a complete reversal from right to left in the entire technic from the time the tongue depressor is applied by the right hand instead of the left, until the dissection is finished with the left index finger and the snare applied over the tenaculum with the loop to the patient's *left* side.

The assistant now takes the tenacula, and the operator both snares, one in each hand, and simultaneously removes both tonsils. If there are adenoids they are at once removed in the usual manner. The operation is completed, the whole time required not exceeding six minutes, including the induction period of anesthesia.

We invite particular attention to the mode of application of the snare, as it is backwards to the usual method, but much to be preferred because the spring action of the wire *makes* it sweep through the fossa and *follow* the capsule, and the muzzle may be crowded *behind* the tonsil because it is not flexible like the wire. The older method often leaves a portion of the tonsillar tissue to bleed or cause further trouble, because the wire loop in the posterior fossa is uncontrollable and does not follow the capsule in many cases.

Up to the instant when both tonsil pedicles are severed practically no hemorrhage has occurred, but at this moment a slight gush of blood is seen, which by reason of the patient's position flows outward and downward over the tongue and out of the mouth. After examining the tonsil beds the nitrous oxid is stopped, while the oxygen is allowed to flow slowly until consciousness is regained, usually requiring from one to two minutes.

The patient is now placed in bed on his side with the face over the edge of two pillows and pointed slightly downward so that the saliva or blood is readily expectorated and not swallowed.

No one factor is greater in the accomplishment of a clean tonsillectomy than the finger dissection. The finger is preferred to any instrument as a dissector or separator of adhesions. This *modified* finger dissection, however, is productive of still less trauma and consequent soreness than where the finger is used alone, since the trauma to the anterior pillar resulting from the excessive pressure required to rupture the mucous membrane connecting the

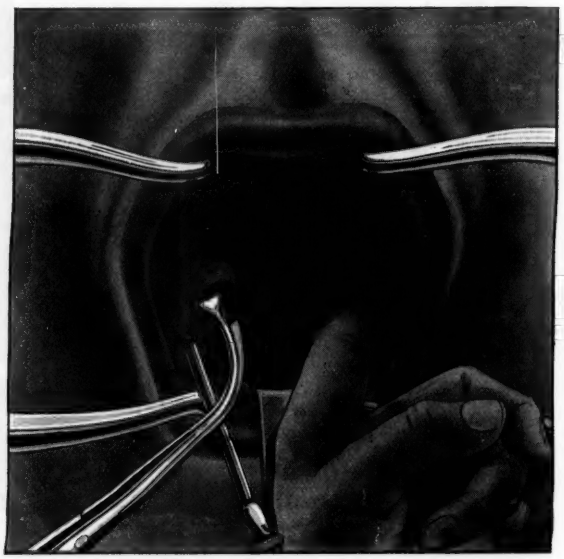

Fig. 3. Snare wire tightened down on pedicle of right tonsil, to be removed after the left is also snared. Finger dissection begun on left, the nail is not used in dissection.

tonsil and anterior pillar is avoided by the use of the blunt curved dissector as described, preliminary to the introduction of the finger-tip.

Hemorrhage, after leaving the operating table, has occurred but once in the past three years in which this technic has been used exclusively, and that was in an arterio-sclerotic woman of 55, whose tonsils were removed because of rheumatism. One child bled in the operating room three to four minutes from the adenoid area. This extremely low record of hemorrhage is attributed to the anesthetic; to the absence of nausea and vomiting; to the erect posture, and more than all, to the total absence of all edged or pointed instruments in the operation. The vessels which enter the tonsils are crushed by the snare and hemostasis thus induced. The vessels of the pillars and pharyngeal muscles upon which the tonsils rest are uninjured, and it is

these vessels which bleed when severed by cutting instruments. For the same reason, our patients eat with little discomfort within 24 hours, because the pharyngeal muscles which begin the action of swallowing are uninjured. In this technic the perimysium is scarcely broken, since in the finger dissection the *ball* of the finger-tip is kept against the throat wall and the nail against the tonsil. Convalescence is further shortened by the elimination of the gauze sponge and its trauma, so that the average patient is entirely well on the third or fourth day, and at no time particularly uncomfortable.

Our technic, comprising the following features, is original:

1. Forward inclined sitting posture with chin near chest.
2. Continuous nitrous oxid-oxygen anesthesia *without ether.*
3. Backward application of the snares.
4. Application of a snare to each tonsil, when both are removed simultaneously.

CONCLUSIONS.

1. This technic is uninfluenced by the size of the tonsil and is equally adapted to the free, the submerged or adherent types.
2. It is applicable to patients of all ages.
3. There is a marked reduction in both the operative and post-operative hemorrhage.
4. The forward inclined sitting posture is natural, convenient, and the safest position for this operation.
5. In this position, blood takes care of itself by gravity, aided by the flow of gases out of the mouth, in a more effectual manner than is possible by sponging, suction apparatus, or any other position in which the operation may be thoroughly done. The danger of asphyxia by inspired blood or froth is absolutely eliminated.
6. Nitrous oxid-oxygen is an ideal anesthetic for this work in this position; the use of ether is never necessary and has not been employed in a case in our last three years' series.
7. The minimized trauma, agreeable anesthetic, followed by no post-operative complications, short and fairly comfortable convalescence produces a more desirable impression upon the patient.

BLADDER TUMORS.

A patient who has a bladder tumor that is not causing pain and that can be felt bimanually, may be given a reasonable assurance that this tumor can be removed by a few treatments with the high frequency current.—E. O. SMITH in *The Lancet-Clinic.*

INTRA-OCULAR NEOPLASMS: CLINICAL REPORT WITH SUBSEQUENT HISTORY COVERING FIVE TO TWENTY YEARS.

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New growths of the interior of the eye occur in two forms—sarcoma, generally found between the ages of 40 and 60, and glioma, always occurring in early childhood, often congenital, though said to have been seen as late as the twelfth year.

According to Fuchs, carcinomata and adenomata have also been observed in the choroid as a great rarity, but only as secondary tumors, mostly from the thoracic glands.

I have included in this report only those cases of neoplasm of which I have been able to ascertain the subsequent history a number of years later. It is this fact which will, I hope, render the report worth while; moreover, although not numerous, these cases emphasize the importance of early diagnosis and prompt surgery, and illustrate both a mistake of the surgeon, fortunately without ill-result, and a mistake of the patient, which probably cost her her life.

I submit records of two certain cases and one almost certain case of sarcoma of the choroid, three cases of glioma in one family of six children, and one of pseudo-glioma, erroneously diagnosed glioma. I have seen five or six cases of glioma altogether, but I have tried in vain to get the subsequent history of the others. I think only one recovered—a child about a year old with the growth still confined within the eye-ball and unilateral.

I.—*Sarcoma of the choroid—well after twenty years.*

On May 1, 1895, Mrs. S., age 60, consulted me on account of blindness in the left eye. Two years previously I had adjusted glasses correcting 3 D of hypermetropia in each eye and giving each perfect vision. I found the left eye blind from detachment of the retina, which the patient thought had existed for about six weeks. The tension appeared normal, there was as yet no pain, and the ophthalmoscopic picture was that of simple detachment. It was before the time of transillumination, so this diagnostic aid was not used. The age of the patient and the absence of both injury and myopia suggested a tumor. The family were told of this possibility and the patient advised to consult me from time to time. In a few months she began having attacks of pain in the eye and soon the tension became increased. The attacks became more severe and intensely painful. Enucleation was urged, but refused, until the

pain was said to be unbearable. Then in November, 1896, just eighteen months after her first visit on account of the blindness, I removed the eye-ball. I cut the optic nerve far back and fortunately, for if my scissors had hugged the sclera, I would have left behind a part of the growth. The tumor had perforated the sclera posteriorly and it protruded here as a smooth, dark prominence, about the size of a small pea. The microscope showed it to be a melano-sarcoma.

I exhibited the eye at one of our medical societies and some of the surgeons present (notably one who has since become a recognized authority on tumors and has written a book on Tumors of the Breast were of the opinion that it would be wiser not to insert a glass eye in such a case; nevertheless, I did insert a glass eye and the lady is alive and well today—twenty years later.

II.—*Sarcoma of choroid, with possible recurrence in orbit—well four years after operation.*

Mr. C., age 36, consulted me April 1, 1910. He had observed that the sight in his right eye was cloudy—"as if there was something in front of it" —for six or eight months. It had grown worse and was now nearly but not quite blind. The ophthalmoscope showed a dark brown mass projecting into the vitreous. It was easy to see by light thrown into the pupil by the Wurdemann transilluminator and so could be demonstrated to his physician and friends. I enucleated the eye on May 1, 1910. The patient returned home and subsequently a glass eye was adjusted. A year later, in May, 1911, he returned complaining of pain around the socket and some irritation in it. I found nothing very distinctive, but as there seemed to be a little nodule in the orbit, I excised it and submitted it to Dr. Hayes Davis. He thought it suspicious, but was not positive of its character, and sent it to Dr. Cyrus Field, of New York. His opinion was that the specimen was sufficiently suspicious to make it wise to exenterate the orbit. On June 1, 1911, I dissected out the orbital contents and curetted the walls. There has been no recurrence. I am told that after exposure the patient had some "neuralgic" pains on that side of the face and about the socket. I last heard from him in March, 1914.

III.—*Probable sarcoma of choroid—no operation —death from paralysis of the opposite side of the body nine years later.*

Mrs. H., age 56, consulted me May, 1901, complaining of blur before the left eye. The vision of this eye was 20/70; external appearance and tension normal. The ophthalmoscope showed a brownish-black tumor growing from the posterior portion of the ball into the vitreous. It presented the unmistakable appearance of a melano-sarcoma. I explained the condition to her daughter and advised enucleation; but in view of the still useful vision and the normal appearance of the eye I suggested that they would be better satisfied to have another opinion. Dr. J. M. Ray was the consultant and fully concurred as to the diagnosis and the wisdom of enucleation. I never saw the patient again and am indebted to her daughter for the subsequent history. She wrote to me last March that her mother lost the sight of this eye, that it changed in appearance, and was frequently very painful; that about four years after I saw her she had a stroke of paralysis on the right side from which she made a fair recovery, until a second stroke five years later, after which she lived only a few months.

Of course, there is room for doubt as to the diagnosis in this case, and at first sight it might seem improbable from the duration of life and from the absence of marked exophthalmos and of the forward growth of the tumor, but, according to Fuchs, sarcoma may remain confined within the sclera for as much as five years; it may produce an iridocyclitis with shrunken globe instead of the acute glaucomatous symptoms (and in this event its growth is retarded) and it may extend along the optic nerve to the brain. This seems the probable course in this case from the changed appearance of the eye—"a change not generally observed, because she wore glasses"—the frequent painful attacks, the gradually developing blindness, and the paralysis on the opposite of the body. This history, together with the ophthalmoscopic appearance, which seemed so plain that two oculists advised prompt removal, leaves, I think, little room for doubt.

The frequency of sarcoma of the choroid is variously estimated at from 1 in 1,500 to 1 in 3,000 cases of ocular disease; remembering the great frequency of external ocular affections, it would seem unlikely that it would occur even once in 3,000 cases. It is generally seen between the ages of 40 and 60. It is always primary and unilateral. It seems to have very slight, if any, association with previous injury. Its course may extend over a number of years and is divided into four stages: first, when it is quiescent in the eye and is manifested by simple detachment of the retina, as in the first of the above cases, or by a growth plainly visible with the ophthalmoscope, as in the last two; second, usually a stage of increased tension with pain and other glaucomatous symptoms, but occasionally in place of this an iridocyclitis with retarded tumor development; third, the extension beyond the sclera, generally along the course of nerves or vessels, and, according to Weeks, most frequently posteriorly; and fourth, metastasis, most commonly to the liver.

The diagnosis, easy when the tumor is visible, as above described, may be difficult when the most conspicuous symptom is detached retina. Increased tension, the absence of myopia and injury, the age of the patient, a smooth detachment rather than a wavy one, and a dark spot shown by transillumination would point to tumor, but the tension is not always nor perhaps generally increased at first, the

retinal appearance may not be characteristic, and transillumination could not be used if the growth were at the back. In such cases we must await symptoms of the second stage.

Prognosis depends on early removal, but according to Weeks, 58 per cent. recur. One-third of the recurrences are local, two-thirds by metastasis. Most cases recur within three years, though one case is reported as recurring eleven years and five months after operation. In removing the eye it is important to cut the nerve far back.

IV.—*Pseudo-glioma mistaken for glioma of retina.*

In November, 1909, Mr. X. brought his little girl, age four years, to see me. Six months previously on covering the left eye, the child said she could not see; not much importance was attached to this speech, but lately she complained of not seeing with the other eye. She had been a perfectly healthy child, had never had a day's illness, nor even been indisposed with any minor affection. About a year previously she had a slight redness of and discharge from conjunctivae, which passed off in a few days.

Examination showed pupil regular and mobile; tension normal; vision: light perception in left eye, large objects in the right. Ophthalmoscope showed partial detachment of the retina in the right and complete detachment in the left eye and in each, but more marked in the left, a yellowish mass. The entire absence of any previous history of illness (given by father and mother of unusual intelligence), the round and mobile pupil without any signs of inflammation, the yellowish growth well developed in one eye and beginning in the other led me to strongly suspect glioma.

I gave an unfavorable prognosis as to sight and advised enucleation of the worse eye as being the safest course for saving life. Another opinion was suggested and a man whose experience is at least the equal of any in our city saw the case in consultation. He was even more sure and urged immediate removal of the worse eye. This, however, the family refused. The subsequent history of the case, as related in a very courteous and complete letter received from the father shows the disease to have been pseudo-glioma. He writes that the little girl, perfectly healthy previous to her blindness, in later years passed through measles, whooping-cough, and chicken-pox, but is now in fine health; that her sight is limited to light perception or little more; that the pupils are contracted and have a yellowish deposit in them, and that the left eye is worse than the right.

These cases of suppurative choroiditis without any external disease or injury of the eye are called by De Schweinitz "metastatic ophthalmitis," and by Fuchs "metastatic ophthalmia." They follow acute infectious diseases, especially meningitis and cerebro-spinal meningitis in children—more rarely the acute exenthemata. *The remarkable thing in the case just related is the entire absence of any symptom of previous illness* as observed by the family of unusual intelligence (the father a druggist by profession). According to Fuchs, the ocular disease is generally caused by emboli, carrying streptococci and lodging in the vessels of the retina more often than in the choroid; less frequently the disease is due to direct extension from a meningitis along the sheaths of the optic nerve. Inflammatory symptoms, sometimes late in appearance, as in the case above described, occur in the course of the disease, producing adhesions of iris to lens, retraction of the peripheral part of the iris with deepening of this part of the anterior chamber and generally some ciliary injection. These symptoms are important in diagnosis, but Fuchs lays most stress on the tension which in glioma is at first normal and soon increased, and pseudo-glioma is soon diminished and followed by shrinking. Blindness generally results but in a few cases, mostly after meningitis, some sight remains.

V, VI, VII.—*Glioma of retina—three fatal cases in a family of six children.*

In November, 1909, Baby W., age three years, was brought to me with glioma in both eyes; in each the disease had already penetrated the globe and was growing rapidly as a red angry tumor in which the structure of the eye-ball was hardly to be distinguished. Enucleation was done simply to relieve pain. The child died two months later, the disease having returned in one orbit and rapidly advanced to adjacent structures. In a preceding baby in this family the disease was observed at a few months of age, but was confined to one eye; the eye was removed when three years old by Dr. Reddish, of Somerset, Ky., but the growth recurred in the orbit, extended to the superior maxilla, and death occurred two months after operation. The third child to have the disease was born October 24, 1912. The disease was noticed in the right eye at the age of two and a half months, the same as the other babies, and a few weeks later in the other eye. Both tumors protruded beyond the orbits; no operation was done; death eleven months after appearance of the disease. I am indebted to Dr. Garfield Howard for a history of these cases, only one of which was under my personal observation.

I have seen several other cases of glioma, but have tried in vain to ascertain their subsequent history. Glioma occurs once in 2,000 cases of ocular disease (Weeks). It is usually observed between the first and third years of life, but may be congenital and then is usually in both eyes; of those appearing after birth 10 per cent. are said to be bilateral.

The diagnosis will be made by the age of the patient (generally early infancy, rarely up to 12 years); the appearance of a yellow vascular mass

seen through the pupil either with the naked eye or with the ophthalmoscope, the absence of early inflammatory symptoms, and, as emphasized by Fuchs, the tension normal at first, but soon increased. In rare cases, as in the pseudo-glioma above described, the diagnosis may for a time be impossible. When in doubt and the eye is practically blind, enucleation is the wisest course.

Prognosis: "Of 143 cases collected from various sources, recovery at least three years after operation was found in 30 per cent.," according to Weeks; it is not stated at what stage these eyes were enucleated, but it would seem probable that most of them must have been removed while the growth was still intraocular. Fuchs attributes the disease to a congenital vice of development; he mentions a family in which two of the children had fatal glioma and a third had coloboma of the iris and choroid. Weeks quotes Wilson as having observed a family of eight children, all of whom had glioma.

Pathologically, glioma is described by Flexner as neuroepithelioma. Lindenfeld, in Graefe's Archiv., 1913, reports what is alleged to be a third case of spontaneous cure of glioma retinae, effected by complete tumor necrosis, followed by phthisis bulbi. In this case the disease was diagnosed in one eye histologically and in the other clinically only. Perhaps some doubt is permissible as to the correctness of the diagnosis, and certainly it would be wise to accept the dictum of Weeks that all cases of glioma will end fatally unless the globe is removed in the first or early in the second stage of the disease—the stages corresponding to those above described in sarcoma.

THE USEFUL SURGEON.

Clinical experience alone will not make a competent surgeon unless he takes the time to thoroughly investigate each case as to the cause and pathological conditions involved, applies recognized methods of treatment and follows the results of his treatment. Too often we find that the so-called surgeon has an extensive practice and he does not take the time required for the proper care and study of cases. However, he gets along mechanically through much operative work, but of what use is such a man to progress, and to the utlimate results of his case? Of what use is he as a teacher of medical students, to the development of proficiency in himself or his assistants? He should let his assistants do the minor and routine work, while he devotes himself to the real progress of surgery.—H. W. WIGHTMAN in the *Medical Record.*

RAYNAUD'S DISEASE: WITH A REPORT OF A CASE.*

W. C. GEWIN, M.D.,
BIRMINGHAM, ALA.

This disease, first described by Maurice Raynaud in 1862, and later given the name of Raynaud's disease by Laveran, is due to a local stagnation of blood occurring at the periphery of the circulation, and is probably vasomotor in origin. It is seen in three different grades or degrees of intensity, viz.: (1) local syncope, (2) local asphyxia, (3) local or symmetric gangrene.

Local syncope is the most common form, and is most often observed in the extremities, producing what is known as "dead fingers" or "dead toes." There are pallor and coldness of the parts affected, and slight anesthesia is usually present. The part has a shrunken appearance, is stiff, and frequently painful. Raynaud suggested that local syncope is caused by a contraction of the blood-vessels of the part involved. This condition is analogous to that caused by intense cold. It usually passes away after a few hours, but returns again and may become almost a constant symptom.

Local asphyxia usually follows local syncope, but sometimes appears as a primary condition. As in local syncope, the fingers and toes are the parts usually affected. The part becomes livid and cyanosed, and there are present numbness, swelling, and more or less pain. When the attack has worn off the affected parts assume a bright red color from the overactive circulation. Recurrences are common, especially during cold weather. This condition is probably due to a stagnant circulation caused by dilatation of the venules and capillaries, with a constant spasm of the arterioles. The paroxysm may last only a few minutes, or it may last hours, and even days. There may be but one attack, or the attacks may recur from time to time, extending over a period of a few weeks, and sometimes even years. Pain is usually a predominant symptom, and may precede, accompany, or follow asphyxia.

Local or *symmetrical gangrene* is a spontaneous form of gangrene occurring during the course of Raynaud's disease. It usually follows local syncope and local asphyxia, and but rarely occurs without previous vasomotor disturbance. As originally described by Raynaud, it is theoretically symmetric, but, practically, this is not always true. Following the usual vasomotor symptoms, small black areas of necrosis appear on the ends of the fingers, or toes, or more rarely on the nose, ears, cheeks, mammae,

*Read before the Jefferson County, Ala., Medical Society.

and buttocks. The gangrenous area is usually small, leaving a scar after it has healed. Rarely, the entire finger or toe may be involved, and spontaneous separation takes place. When the gangrene is of a more severe type, the areas of necrosis gradually extend to the adjacent tissues and deeper parts.

CASE REPORT: T. C., colored, age 43 years, a patient of Dr. M. C. Schoolar, height 5 feet 7½ inches, average weight 150 pounds. Present weight, 145 pounds. Father died of "senility" at the age of 80 or 85 years. Mother died of "dropsy" at the age of 45 or 50 years. Two brothers killed acci-

dentally at the age of 28 and 43 years, respectively. Two sisters living and in good health, and two died when infants.

Health during childhood was good. Had smallpox at the age of 30. Has had gonorrhea, but denies syphilitic infection. He first noticed the present trouble in January, 1906. The initial symptom was pain in the extreme end of the right great toe. About one month later he noticed a very small black spot on the end of the toe, which slowly grew larger. The pain was severe at times. He consulted Dr. West, of Live Oak, Fla., before the appearance of the black spot, who, he says, prescribed a solution of salicylic acid locally. In April, 1906, he consulted Dr. Moore, of Centerville, Ala. At this time the black spot was about the size of a dime. In May, 1906, he consulted Dr. Ransom, of Birmingham, Ala., who amputated the toe. With the exception of a burning sensation of the foot, he had no further trouble until February, 1907, when the big toe of the left foot began in just the same way as did the toe of the other foot. This toe was amputated in October, 1907, by Drs. Schoolar and Moore, of Centerville, Ala. In December of 1908, the fifth toe of the right foot became involved, and was amputated in February, 1909, by Drs. Williams and Peters, of Centerville, Ala. The second toe of the left foot began to give trouble during the early part of 1910, and was removed by Drs. Williams and Peters in June of the same year. The third toe of the left foot was amputated by Drs. Williams and Peters in June or July, 1911. The right foot was amputated through the tarsal bones by Drs. Williams and Peters in January, 1912. The right leg was amputated by Dr. Stover, of Little Rock, Ark., in June, 1912. The second finger of the right hand became involved in December, 1912; the finger nail came off, and the end of the finger suppurated, but was entirely healed by the latter part of February, 1913. Necrosis again appeared on the end of this finger in November, 1914. A few days later the first and third fingers of the right hand showed evidence of necrosis. During the early part of December, 1914, he consulted Dr. M. C. Schoolar, of this city, who referred him to me, with a diagnosis of Raynaud's disease. On December 31, 1914, with the assistance of Dr. Schoolar, I amputated the first finger between the first and second joints; the second finger at the first joint, and the third finger between the second and third joints. He left the Birmingham Infirmary on January 3, 1915, and at the present time the wounds are apparently in good condition, but there is beginning gangrene of the fourth finger of the same hand.

COLOPTOSIS AND PROSTATIC DISTURBANCE.

I have had several cases in which ptosis of the large bowel, but particularly in which redundancy of the sigmoid, has obviously been an exciting cause of disturbance of the prostate. In these cases the patient is generally more comfortable in bed, but the moment he assumes the erect posture, the pressure on the prostate causes great discomfort, which is only slightly relieved by urination. Defecation, however, if thorough, brings complete relief, which lasts until the sigmoid or the transverse colon, as the case may be, again becomes loaded. If the rectum is examined at this time it will be found empty, showing that the pressure comes from higher up. In three cases of this kind, resection of the redundant sigmoid has been followed by complete relief, while the symptom has disappeared with others in several other cases following reposition of the ptosic colon.—CHARLES A. L. REED, in *The Lancet-Clinic.*

CHRONIC CHOLECYSTITIS.

Chronic cholecystitis with recurrent attacks, in the absence of other conditions, certainly warrants operative interference. I have very little faith in medicine under these conditions or treatment at the various watering-places.—JOHN B. DEAVER in *The Therapeutic Gazette.*

PELVIC KIDNEY—PYONEPHROSIS WITH STONES: A CASE REPORT.

W. KOHLMANN, M.D.,
NEW ORLEANS.

Abnormal development of the genito-urinary system is more frequent than of any other part of the body, a fact which is not generally appreciated.

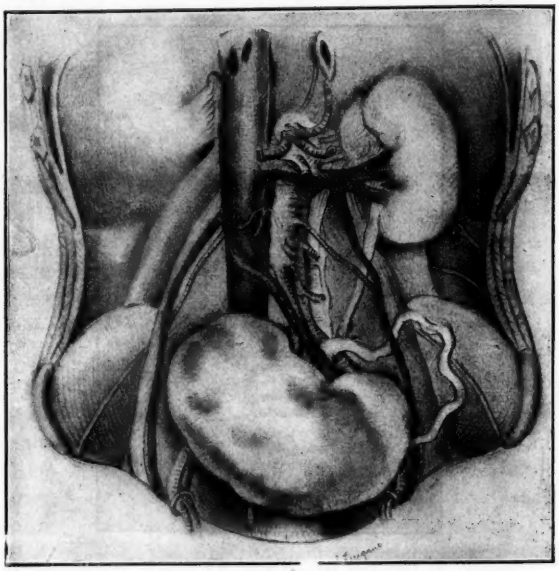
In the diagnosis of the abnormalities of the kidney, the associated anomalies of the general system are to be drawn into consideration, as they are developed together and caused by defects in development in the early embryonic stage. Such conditions are frequently found associated with congenital atresia of anus, double or bicornate uterus, absence of vagina, uterus, etc. Craven Moore estimated the frequency at 33 proc. Guizzetti and Parizet report fifty-eight cases of anomalies of the kidney; they find in those cases where a horseshoe kidney exists the genital organs are normal, whereas in those cases of congenital dystopia malformations of the genital organs are frequent, especially absence of the vagina and uterus.

When congenital anomalies are present, an existing abdominal tumor should awaken a suspicion of an ectopic kidney. In spite of the fact that there are indications in the anamnesis to permit a probable diagnosis, such a diagnosis, as a rule, is not made before the operation except in the minority of cases. Most of the reported cases are accidental findings in the course of operation on the kidney or other abdominal organs, or are contained in post-mortem reports.

The subject has to be kept more in mind by the diagnostician and with the assistance of the improved technic of cystoscopy and radiography, no doubt such diagnosis will be made more frequently, as in a case recently reported by Thomas in the *Annals of Surgery*, where the diagnosis was made by colloidal silver injection.

In the following case the diagnosis was not made, although the possibility of such a condition was considered on account of the urinary findings. A careful clinical examination was not possible on account of the critical condition of the patient, who presented symptoms of an acute surgical abdominal disease; immediate operation was deemed necessary.

Mrs. J. D. B., age 24, married. Admitted to Charity Hospital, December 9, 1914. Anamnesis: Was always in good health until about six months previous to admission, when she began suffering with abdominal pains, at times complicated with frequent micturition. Is suffering from a rectal fistula following an operative procedure about three months prior to admission. Has never menstruated. Present status: Fairly well nourished female; breasts well developed; abdomen distended and painful on slightest touch, especially in pelvic region. Examination of the genital organs shows in the region of the vaginal opening only a slight depression of the skin, about one-fourth of an inch in depth. A small fistulous canal leads from this depression into the rectum. By rectal examination neither uterus nor ovaries are palpable; a large mass filling the pelvic cavity can be made out, but on account of the extreme sensitiveness on abdominal palpation the possibility of any diagnosis is excluded. Temperature from 100° to 102°. Urinalysis showed pus cells and traces of albumin.



Operation December 12, 1914: Median abdominal incision below the umbilicus about four inches in length. Examination showed absence of uterus; ovaries were found of normal size situated high in the abdominal cavity, the right in the line of the umbilicus and the left a little lower.

The left kidney was found in normal position and of normal size. On the right side no kidney was found. The whole pelvic cavity was found filled by a large mass, apparently retro-peritoneal. Upon dividing and pushing back the peritoneal covering the tumor could be recognized as a pelvic kidney. After the renal artery and vein, originating rather low, were tied, the tumor could be loosened and removed. The ureter was greatly dilated and was entirely displaced to the left side on account of the size of the tumor.

The tumor after removal was the size of a fetal head and was filled with pus and stones of varied size.

Involuntary urination very often means a distended bladder, and in old men it should at once indicate an examination into the condition of the prostate. Vomiting, too, is often caused by distention of the bladder.

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, MAY, 1915.

THE REMOVAL OF NEEDLE FRAGMENTS FROM THE SKELETAL MUSCLES.

The removal of small foreign bodies, usually fragments of needles, from the hand, foot, or other parts of the extremities, is one of the most common operations that physicians are called upon to perform. Regarded as a minor operation, there is nevertheless no procedure in the entire field of every-day surgery that makes a larger demand upon skill, patience, and precision. The often-seen infections of hashed muscles and fasciae following a frenzied, fruitless search for the elusive "needle in a haystack" are eloquent of the truth of this statement, which, indeed, we are sure our readers are ready to concede from their own experiences.

Recent literature contains various articles on the employment of the compass and magnetized needles in locating steel and iron bodies in the tissues. These, and the electro-magnet itself, may be occasionally a little helpful, but their aid is small and often *nil*. The essentials to a successful, clean removal of a buried foreign body are accurate localization and a systematic dissection conducted in good light, through a bloodless, anesthetized field, with the aid of patience and an ungloved finger-tip!

In the first requirement, localization, much can often be determined by considering the point of entrance and the anatomy of the underlying tissue, the nature of the foreign body, the conditions under which it entered, the time elapsed since the accident, and the local reactions, if any, that have developed (pain, tenderness, infection.) *Circumscribed* tenderness is especially significant, making allowance, of course, for tenderness due to infection, if there be any. Pressure with a probe may elicit a single spot of tenderness or a point of maximal and other points of lesser tenderness. The single or maximal point suggests the location of the most superficial part of the foreign body, and the points of lesser tenderness map out, in a general way, its direction. These clinical signs, not always obtainable to be sure, are less apt to deceive than a hastily conducted fluoroscopic examination or a single roentgenogram.

On the other hand, a properly conducted roentgenography is the best means of localization of glass and metal bodies (wood splinters are usually easily located by palpation, probing or dissection), and should always be employed before cutting down upon such a body unless its superficial location is quite evident.

Systematic fluoroscopy (the examiner being properly protected) is very helpful, indeed, in locating foreign bodies in the smaller parts, as the hand, foot, and forearm. By moving the part about before the screen and noting the comparative excursions of the shadows of the body and the bone, one can definitely determine their relation to each other, the direction and length of the body, and the depth of its extremities. Bismuth powder dusted in the skin folds will afford the means of determining the depth of the body from the surface. A single roentgenographic picture is far less useful than such a fluoroscopic examination. Pictures taken in two right-angled directions are more helpful, but still very insufficient. Stereoscopic pictures, especially if the skin creases are dusted with bismuth, will furnish a precise demonstration of the length, direction and depth of the body and its position with reference to the bone and the skin.

But even this clear demonstration, this visualization of the object in the depth, cannot be transferred to the surgical wound with such exactness that, without nice dissection and careful technic, the body can be found. There are no landmarks in the tissues from which to make measurements, except the bones; and there are no means of obviating the quarter-of-an-inch miss that "is as good as a mile." The stereoscopic picture does not lie, nor do the demonstrations of a painstaking fluoroscopic study; these must be projected mentally into the wound, but they carry no calipers with them, and require, therefore, a deliberate, systematic operation to lead to sure success.

The hoary advice to make the incision across the

axis of the needle is good only if the object is quite superficial. Otherwise the incision should be in the line of the underlying muscle fibers. Fascial planes should be cut and retracted; tense strands of fascia feel much like the sought-for needle, just as small veins often look like the buried bit of steel. The muscles in their turn should be bluntly divided and retracted, the operator himself inserting the instruments, and thoroughly but very delicately palpated with the naked finger-tip. Sponging is to be avoided, if possible, and is unnecessary when a constrictor can be employed.

At each step of the search the manipulations should be thus gentle and deliberate, guided by a definite mental picture of the roentgenographic demonstration, and a careful regard for, and precise knowledge of the anatomical structures in the neighborhood—muscles, fasciae, nerves, and blood-vessels. It is when the operator is most apt to become impatient that he needs his patience most. Reckless, fretful chopping up of the tissues, far from discovering the needle, is most apt to make its discovery all the more difficult. With patience and deliberation, careful localization, nice dissection, and palpation will almost always lead to success; unless one has more luck than skill, a hasty localization and a haphazard or crude operation will yield only disappointment, disfigurement, and infection.—W. M. B.

CANCER NUMBER.

At the request of the Cancer Commission of the Medical Society of the State of Pennsylvania, and as an aid to its efforts, the July issue of THE JOURNAL will be devoted, in part at least, to cancer.

We solicit for that issue informative contributions on the early diagnosis of cancer, the treatment of its various forms, cancer statistics, etc.

Surgical Suggestions

The employment of a tourniquet greatly facilitates operations on the extremities, and is applicable for most of them.

Compound tincture of benzoin (friar's balsam) will form a protective film on mucous membranes and moist surfaces, just as collodian does on the dry skin. It is useful in coating fissures and protecting other wounds of the mouth or anus.

Chiropodists' adhesive plaster strips, obtainable on spools, supply a neat and convenient means of fastening bandages of the fingers and toes.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

SOCIALIZING THROUGH FIRST AID TEAMS.

The general tendency toward the enactment of workmen's compensation acts is accompanied by numerous activities on the part of employers to prevent accident and disease among their employees. The Monthly Bulletin of the American Iron and Steel Institute indicates how thoroughly interested some employers are in this work. Every step that will prevent infection of a wound is considered as meriting careful attention and constructive organization.

Of the 15,000 cases in which awards were made by the New York State Compensation Commission during 1914, 2,100 cases were examined by the medical department. Of these a little over 14 per cent. were due to septic infection. Had it been possible to prevent this infection in one out of every six injured, probably the large majority of these cases would have recovered within the period prescribed by law for non-compensatable minor accidents. The possibilities of preventing infections are manifest in the experience of the American iron and steel industry, where formerly about half of the wounds were infected, while to-day little more than one per thousand cases of injury become infected. The saving in time, the decreased payment of compensation, the prevention of deformities and invalidism indicate the economic worth of first aid to the injured.

It is enlightening to realize that competition in first aid work exists in the mining industry and in the iron and steel industry. The first aid teams are organized, trained, and developed to a high state of efficiency in the various industrial plants so that the well-intentioned employees may be of prompt and effective service to their injured co-workers.

To illustrate, the Ellsworth Collieries Companies in 1912 trained 104 men in first aid work, and in 1914, 180 men. Three squads of six men were trained in the use of oxygen helmets. Forty-one men received first aid certificates from the United States Bureau of Mines, while six teams made 100 per cent. in the third annual mine safety demonstration with the judging done under the auspices of the American Red Cross Association.

As a result of the various precautions taken for the prevention of mine accidents, the installation of mechanical safety devices, general instruction in mine safety, and the equipment throughout the mine are responsible for the reduction, by 50 per cent., of the accidents within the last six months.

The Cambria Steel Company maintains a first aid instructor devoting his entire time to this work. First aid emergency boxes are conveniently placed at numerous points throughout the plants. As a result of this intelligent attack upon the accident situation, the Cambria Hospital reports that injured men reach the hospital in better physical condition than in former years. The rate of infection has

been decreased to one-quarter of one per cent. of the cases that were handled. Each year about twelve teams of six men each compete for the first aid plant championship. The employees co-operate very actively, realizing that this is a practical scheme for their own protection and betterment.

The Empire Steel and Iron Company has organized a general safety committee composed of superintendents of all divisions and sub-committees composed of foremen and employees at each plant. Inspections and installation of safety devices are in the hands of the general safety committee. To the sub-committees is entrusted the education of their fellow-workmen in problems relating to safety. The results of their general campaign is indicated by the fact that while the number of men shifts employed in 1914 was 50 per cent. higher than in 1913, the number of accidents during 1914 was decreased by 11.6 per cent.; the time lost on account of accidents decreased 12 per cent., and the benefit money paid employees for injury employers' liability act decreased 56 per cent.

Such facts and figures impress themselves upon employers and employees alike as the evidence of industrial protection leading to a better understanding of the social value of human beings in the terms of industrial welfare. The economic value of a man from the standpoint of the state is not the only consideration.

It requires little thought to appreciate the fact that decreasing the number of industrial accidents redounds to the welfare of the families of the employees and lessens the degree of family impoverishment through the necessities of unemployment and invalidism.

First aid to the injured has become an economic project. It may be thoroughly divorced from all thought of philanthropy, be freed from the influences of emotional sentimentality, and stand forth as a purely economic project. Large employers of labor are to-day concerned in conserving the lives and limbs of their employees because it pays. It is good business. It is a sound industrial policy. This is no stricture upon the motives of industrial concerns. Whatever is best for society as a whole will slowly be recognized as a practical industrial economic paying proposition.

Safety devices, first aid packages, rescue teams for mines, and trained workers in first aid simply indicate that the prevention of accidents, the limitation of infection, the prompt control of hemorrhage, and various other procedures are recognized as essential forms of welfare work to be undertaken and controlled in hazardous industries. In the interests of employees and employers, modern antiseptic sugery is playing its part in the socialization of industry.

There are two operations in which the surgeon may wisely elect to dispense with rubber gloves, viz., in suprapubic prostatectomy and in searching for a buried needle.

Book Reviews

Progressive Medicine. Edited by H. A. Hare, M. D., Professor of Therapeutics, Materia Medicæ and Diagnosis in the Jefferson Medical College, Philadelphia; assisted by Leighton F. Appleman, Instructor in Therapeutics, Jefferson Medical College, Philadelphia, March 1, 1915. Philadelphia and New York: Lea and Febiger.

This number contains the following reviews: Surgery of the Head and Neck, by Charles H. Frazier; Surgery of the Thorax, excluding diseases of the breast, by George P. Müller; Infectious Diseases, including acute rheumatism, croupous pneumonia, and influenza, by John Rühräh; Disease of Children, by Floyd M. Crandall; Rhinology and Laryngology, by George B. Wood; and Otology, by Truman L. Saunders. As usual, in these numbers, all the reviews deserve the highest praise.

Federal Narcotic Record Book. For Physicians, Dentists and Veterinarians. Chicago: The Abbott Laboratories, 1915. Price, 25 cents.

A convenient book for recording narcotics on hand and those dispensed, as required by the Harrison law, the essential features of which are also set forth.

"Swat the Fly," a One-act Fantasy by Eleanor Gates, author of "The Poor Little Rich Girl." New York: The Arrow Publishing Co., 1915. Price, 25 cents.

A whimsical dramatic portrayal, cleverly conceived, of the dignity and importance of animal experimentation, the inconsistencies of the anti-vivisectionist, and the menace of the disease-disseminating fly.

Progress in Surgery

A Résumé of Recent Literature.

Intestinal Obstruction; an Experimental Study of the Causes of Symptoms and Death. F. T. Murphy and B. Brooks, St. Louis, *Archives of Internal Medicine*, March 15, 1915.

1. In intestinal obstruction, the content of the obstructed bowel contains a toxin, which, when absorbed in sufficient amounts, produces definite symptoms and pathologic lesions and death. 2. The toxins are the result of bacterial growth. They are not specific for any part of the intestinal tract, and may be formed in the gall-bladder. 3. The chemical and physical characteristics of the toxic substance may vary with the length of time which the obstruction has existed, as well as the different conditions under which the obstruction occurs. 4. The toxin may enter the circulation by way of the thoracic duct. 5. Death after intestinal obstruction is the result of a toxemia which may be independent of infection of the peritoneal cavity or general circulation. 6. The toxic substance does not pass through the normal mucous membrane. 7. In the production of symptoms, the factors which make this absorption possible are more important than the factors which produce toxin. 8. Interference with the circulation of the obstructed intestine is an essential factor in allowing this abnormal absorption. 9. Simple obstruction of a segment of duodenum or jejunum results in earlier and severer symptoms than a similar obstruction of the ileum because the secretion into the lumen of the former leads to rapid distension and circulatory disturbance in the bowel wall. 10. The symptoms and pathologic lesions following the intravenous administration of the contents of a segment of bowel after obstruction are the same as those described, resulting from intravenous injection of certain of the ptomaine poisons. 11. In the surgical treatment of cases of intestinal ob-

struction, that part of the intestine with a mucous membrane which has been so damaged as to permit of abnormal absorption should be resuted rather than drained.

The Pre-Operative Diagnosis of Tubercular Mesenteric and Retroperitoneal Glands. E. H. RISLEY, Boston, *Boston Medical and Surgical Journal,* February 18, 1915.

1. Tabes mesenterica is often a primary disease with sometimes a fairly distinct clinical history and signs. It most often simulates acute appendicitis, and when in this stage should demand surgical intervention.

2. In the absence of palpable glands, however, it is impossible to make a correct pre-operative diagnosis in many cases, there being no symptom-complex distinctive enough of this condition.

3. A great many people harbor tubercular mesenteric glands in various stages of activity without symptoms.

4. The disease has two clinical types: (*a*) a slowly progressing one, generally with palpable glands; (*b*) an acute fulminating type, most often simulating and impossible generally to differentiate from appendicitis.

5. The prognosis in the subacute stage is good without operation. In the acute stage exploratory laparotomy should be done, but the glands not removed unless there are definite indications either from adhesions, ulceration or size of mass producing pain or mechanical obstruction.

6. In children and young adults with a history of right-sided abdominal pain, with or without palpable masses, tabes mesenterica should always be considered as a possibility.

Gall-Stones During the Course of 1,066 Abdominal Sections for Pelvic Disease. REUBEN PETERSON, Ann Arbor. *Surgery, Gynecology and Obstetrics,* March, 1915.

The author says that when the abdomen is opened for pelvic disease, the gall-bladder should always be palpated except the condition of the patient or the possibility of contaminating clean peritoneum forbids it. In from 10 to 15 per cent. of the cases, gall-stones will be found, their frequency depending upon the patient's age rather than upon the character of the pelvic disorder. Eighty-four and four-tenths per cent. of the 135 cases with gall-stones in the present series had borne children. In Peterson's experience, gall-stones removed at the time of pelvic operations leave from 85 to 90 per cent. of the patients free from symptoms referable to the gall-bladder; while if, for any reason peculiar to the case, the calculi are left, 30 per cent. of the patients subsequently complain of this condition. Peterson therefore advises that gall-stones should always be removed if this can be done without additional risk to the patient.

The "Acute Abdomen" in Children. D. N. EISENDRATH and ALFRED A. STRAUSS, Chicago. *Illinois Medical Journal,* April, 1915.

There are points of difference between the various acute abdominal conditions in adults and in children. The failure of proper rotation of the cecum, for instance, the likelihood for acute tuberculosis in the abdomen, the relative frequency of intussusceptions—these and other conditions prompt these authors to emphasize the need for bearing in mind a clear outline of the possible surgical diagnoses in acute conditions of children. They suggest thinking of the viscus likely to be involved and they present the following classification based upon a large variety of cases observed:

I. 1. Inflammations of an appendix attached to a fully rotated cecum. 2. Inflammations of an appendix attached to a cecum which is not rotated, i. e., lies just below the liver. 3. Inflammations of an appendix lying in the true pelvis and complicated by ileus due to kinking of the terminal ileum. 4. Acute tuberculous infection of the appendix, simulating ordinary acute pyogenic infection. 5. Acute inflammations of the lymph glands along the iliac vessels.

II. Acute infections of the liver.

III. Acute infections of the intestines. Obstructions due to (a) intussusceptions (most frequent of all); (b) persistent Meckel's diverticulum (rare); (c) kinking of coil around inflamed appendix; (d) strangulation of hernia (relatively rare).

IV. Acute infections of the peritoneum. (a) Acute pyogenic conditions secondary to appendicitis, gangrene of ovarian cyst followed twisted pedicle, or inflammation of Meckel's diverticulum; (b) acute tuberculous peritonitis. This outline will be helpful. One must remember the role which persistent embryologic structures play. Pain and tenderness are least marked in the youngest children, also vomiting. Rigidity is not a reliable symptom for young children but tympanitis appears early and is pronounced. The leukocytosis is often puzzling rather than of any direct aid. Rectal examination should never be neglected.

The Boas-Oppler Bacillus and the Diagnostic Importance of Its Presence in the Gastric Contents. GRAHAM CHAMBERS, Toronto. *The Canadian Medical Association Journal,* March, 1915.

The results of the author's experience indicate that the lactic acid bacilli are present in the test-meal of the great majority of cases of cancer of the pylorus in which there is absence of free hydrochloric acid. The bacilli are frequently present in malignant ulceration of the stomach, in which there is absence of free hydrochloric acid in the gastric contents, and this may be so in either the presence or absence of pyloric obstruction. In a considerable proportion of cases of gastric cancer in which a small amount of free hydrochloric acid is present Boas-Oppler bacilli are found.

The absence or deficiency of Hcl thus seems to favor the growth of the bacilli, but occasionally their growth sets in without any change in the acidity of the secretion. The necrotic and ulcerating processes, frequently present, seem to form a nidus for the growth of the bacilli.

Twelve Commandments to Avoid Crippling in Our Wounded Soldiers. PROF. RITSCHL, Freiburg. *Medizinische Klinik,* February 7, 1915.

The following instructions have been printed on a placard to be hung in hospitals in Germany:

1. Remember that rest of joints (stiffness) and muscles (atrophy and weakness) is harmful.

2. Do not depend on orthopedic mechanical after-treatment, but attempt to avoid it by your results. In severe cases, however, refer your patient to mechano-therapy as early as possible in order to save time, trouble and money.

3. Avoid keeping joints in one position; move them as soon as the fracture is healed (change angle of joints; use passive motion).

4. Attempt to retain the valued power of the muscles by the very early use of massage, electricity and active movements, both with and without resistance, performed under your supervision.

5. Remember that extensors atrophy much more rapidly than flexors. Above all, try to keep the deltoid and the quadriceps femoris intact, as the arm and leg without them are of little use.

6. If on account of severe injury to soft parts prolonged immobilization becomes necessary, place the joints in a position in which, if ankylosed, they will be most useful:

Shoulder: In the position afforded by an ordinary sling.

Elbow: At a right angle.

Forearm: In pronation.

Wrist: Over-extended as in writing, or as in clenching the fist.

Fingers: Slightly flexed.

Hip: Slightly flexed and abducted.

Knee: Slightly flexed.

Ankle: About at right angle and slightly rotated inward.

7. Avoid allowing the wrist to fall into continued flexion when the arm is carried in a sling, since if permanent, tight closure of the fingers is prevented.

8. Keep fingers limber. Don't overbandage them and don't forget to tell the patient to keep them in motion.

If possible retain some sort of grasping organ (Greifzange), for an artificial hand is insensible.

9. Stimulate circulation, especially in individuals confined to bed, by means of movement of the limbs and by deep breathing; for increased blood supply stimulates internal organs and increases their regenerative capacity.

10. Remove extravasated blood as soon as possible (elevation, massage, heat, hydrotherapy), for coagulated blood causes irritation, leading to adhesions and when present in large amount to fibrous bands. The latter, however, cannot, as a rule, be entirely removed. Remember that the absorption of blood and lymph is most impeded in the distal parts of the limbs, and that the spontaneous absorption in this location must always be supplemented by artificial means.

11. Do not consider it below your dignity, in doubtful cases and in cases where your own technical ability is insufficient, to call in a more experienced practitioner, for by this means not only do you increase your knowledge, but the patient is benefited.

12. Don't neglect mechanics, for our body is a mechanical marvel. Only that person is fitted to repair a complicated machine who understands its mechanism and who is himself a good mechanic.

The End-Results in One Hundred Cases of Fracture of the Elbow; Immobilization in Hyperflexion Combined with Early Passive Movements and Massage. HAROLD NEUHOF and HEINRICH F. WOLF, New York. *Surgery, Gynecology and Obstetrics,* March, 1915.

By hyperflexion, the authors mean not merely acute flexion, but the most acute flexion in which the elbow can be fixed without obliterating the radial pulse, following the reduction of the displaced fragments. Mobilization and massage must be practiced only if they are painless. The treatments consist in gentle stroking massage and slight flexion and extension movements at the elbow. There must be no sudden movements and after each treatment the elbow is fixed in hyperflexion. Treatment may be tentatively begun on the fourth or fifth day after the accident. In forty cases, the authors had twenty-three perfect results.

The Operative Treatment of Fractures. A. R. SHANDS, Washington, D. C. *Virginia Medical Semi-Monthly,* January 22, 1915.

Shands here expresses the conviction, reached after sixteen years of additional experience, that his early enthusiasm in favor of open operation in cases of fracture was celestial fire burned to a false god; for, apart from the fact that the results of operation are no better, often not as good, the danger of sepsis, despite care and good technique, is too grave to be lightly invoked. The reason for the danger is obvious: the traumatized tissue, ever present in a recent fracture, is unable to resist the low grade pus germs often conveyed to the seat of the injury by the blood current; the devitalized tissue, which is unable to absorb the serum and clotted blood, sloughs off, giving rise to a sero-purulent discharge that retards callus formation, resulting in non-union, and often in septic pneumonia. Only after conservative measures have been tried and have failed should operation be resorted to. Three or four weeks after the fracture will not be too late.

And yet there are fractures, such as of the patella, the olecranon, certain conditions of the elbow and shoulder joints that call for operation to obtain anything like good results; in the first two, open operation and the use of absorbable suture is recommended as a routine practice. The danger in trying to manage fractures involving the anatomical neck of the humerus by manipulation is that it can rarely be done without exposing the fragments. Then, too, soft tissues are often jammed in between the bones. The retention of the fragments, once they are placed in proper position, is not difficult. Shands recommends that in easy cases a suture of fine wire be used; in difficult ones, a spike. This latter is often allowed to project through the skin to be pulled out when the bone is anchored by callus, say in about three weeks. In either case the arm is placed in adduction, held against the chest, leaving the locking of the serrations of the fragments to maintain the reduction. Later the arm is held in abduction with light plaster-of-Paris spica bandage. He advises, whenever the fracture is complicated with subluxation, the removal of the head of the humerus. Massage and passive motion should be begun as soon as union is established.

Fractures of the elbow, of which the most common is the supracondyloid, require operation. After a two-inch longitudinal incision, the assistant makes long traction while the condyles are pried into position by means of a broad bladed periosteal elevator. The serration of the fragments having become engaged, the forearm is flexed to an acute angle on the arm and confined to that position for three weeks, when massage and passive motion should be begun.

In many fractures of the forearm, especially where the radius is involved, functional results can be attained only through an open wound. If the fracture is between the insertion of the pronator and supinator muscles, perfect alignment may result after rotation of the upper and lower fragments—a condition which, if not corrected, will result in the destruction of pronation and supination. An operation, with a snugly fitting plaster-of-Paris cast, confining wrist and elbow, will bring about good function.

In Colles's fracture after the operation, the plaster cast should be so applied as to give free use to thumb and fingers, thus preventing stiffening.

In fractures of the femur Shands recommends that reduction be accomplished by means of a traction apparatus under a general anesthetic; then the application of the plaster-of-Paris bandage from the nipples to the toes. Then *x*-ray pictures must help one to decide whether the position is correct. As to fractures at the neck of the femur, operation is justifiable in case of non-union.

Experiments in the Production of Abortion and Labor by Use of Placental Extracts. ARTHUR H. CURTIS. *Surgery, Gynecology and Obstetrics,* March, 1915.

Curtis finds experimentally that extract of human placenta in normal salt solution is oxytocic for pregnant guinea-pigs and rabbits; and defibrinated blood from pregnant and puerperal women possesses similar properties in a lesser degree. Normal salt solution or defibrinated blood of non-pregnant women does not disturb the pregnancy. Finally, extract of guinea-pig placenta in normal salt solution seems to be slightly oxytocic for pregnant guinea-pigs, although no influence was exerted by blood from pregnant or puerperal guinea-pigs.

The Radium Treatment of Fibroid Tumors. HOWARD A. KELLY, Baltimore. *Surgery, Gynecology and Obstetrics,* March, 1915.

Kelly concludes that massive radium treatment of uncomplicated fibroid tumors stops the excessive flow and in younger women may regulate, without stopping it. It reduces the size of the growths, relieves pressure symptoms, and may even cause large tumors to disappear. If radium is tried and fails, operation can be undertaken without additional risk, which is not always the case, however, in cases of cancer of the cervix. Kelly believes that with increased experience and improved technic, most patients may be relieved of hemorrhage and that, roughly speaking, nine cases out of ten the tumor may be done away with without serious discomfort or risk.

Complete Removal of Adenocarcinoma of Uterus by Exploratory Curettage. L. J. LADINSKI, New York. *Surgery, Gynecology and Obstetrics,* March, 1915.

Ladinski reports three personal cases and reviews the literature at length. His specimens were all examined by competent pathologists and in all of them it appeared that the small neoplasm had been completely removed by the curette. The author raises several questions of interest to those engaged in pelvic surgery.

Ovarian Tumors in Pregnancy. W. C. DANFORTH, Evanston. *Surgery, Gynecology and Obstetrics,* March, 1915.

While ovarian tumors are not especially common during pregnancy, they must not be overlooked. Removal should

be undertaken as early in pregnancy as possible, the danger to the mother being practically *nil*. The danger of abortion is not great, less so than expectant treatment. Complications, such as twisting of the pedicle, rupture or suppuration, demand immediate operation.

Tubercular Infection Complicating Pregnancy, Parturition, and the Puerperal State, with a Consideration of Its Bearing on Treatment. E. P. DAVIS, Philadelphia. *The Therapeutic Gazette,* March 15, 1915.

Tubercular infection of the female genital tract is not very rare and therefore full performance of the reproductive function may be undertaken by organs already tuberculous. Tuberculosis is especially harmful to the pregnant woman because her blood is already called upon to furnish iron and calcium for the fetus—two substances which she needs in repelling disease. The question of permitting the continuance of a pregnancy in a tubercular individual depends on the age of the patient, her general state of nutrition, her surroundings, what she can do to guard her health, and what may be the possible value of the infant life. If during pregnancy signs of renewed tubercular infection appear, pregnancy must end immediately. In such cases the responsibility of the physician does not end with the termination of the gestation, but the woman must be sterilized at the same time.

This is best accomplished by the method advocated by Sellheim. He opens the abdomen excises and removes the tubes; opens the uterus at the fundus transversely, separates its walls and removes the ovum with the gloved finger. The cervix is then dilated by passing a solid bougie, and a strand of gauze is carried through the cervix into the vagina. The cavity of the uterus is tamponed with gauze and the uterus is closed.

Internal Hydrocephalus. An Experimental, Clinical and Pathological Study. WALTER E. DANDY and KENNETH D. BLACKFAN, Baltimore. *American Journal of Diseases of Children.* December, 1914.

Dandy and Blackfan report a very complete series of careful experiments and observations, and their conclusions are worthy of detailed consideration:

An internal hydrocephalus was experimentally produced in dogs by placing an obstruction in the aqueduct of Sylvius. It is therefore evident that the cerebrospinal fluid is formed in the ventricles faster than it can be absorbed and that the aqueduct is necessary for its escape. An internal hydrocephalus resulted from placing an obstruction in the aqueduct of Sylvius in spite of extirpation of the choroid plexus of both lateral ventricles, though this procedure modifies the grade of the hydrocephalus. An internal hydrocephalus may also result from experimental ligation of the vena magna near its origin; when the ligature is more distally placed or when the sinus rectus alone is ligated, it does not result.

Cerebro-spinal fluid is derived mainly from the choroid plexuses, probably both by filtration and by secretion. An increase of fluid is caused by general venous congestion as demonstrated by temporary jugular compression. Drugs and glandular extracts produce but slight change in the rapidity of formation of the fluid. There is a definite impermeability of the fluid-forming structures. Of the various substances in the blood only traces of a few find their way into the cerebro-spinal fluid. The fluid is more strongly protected from substances in the blood than the peritoneal, pleural or pericardial fluids. There is a rapid and constant formation and absorption of cerobrospinal fluid. A new supply is formed and absorbed at least every four to six hours. The lymphatics play a neglible part in this absorption, as the fluid is absorbed directly into the blood. Absorption is from the entire subarachnoid space. It is a diffuse process and does not take place through specialized structures such as the Pacchionian granulations. There is practically no absorption from the ventricles. The maintenance of an equilibrium between the formation and the absorption of cerebrospinal fluid necessitates a communication between the ventricles and the subarachnoid space, which occurs only through the foramina of Magendie and Luschka. After the introduction of phenolsulphoneplitalein into the subarachnoid space it soon appears in the lateral ventricles, proving that there are no valves at these openings.

Internal hydrocephalus can be divided into two anatomically different types, depending on the patency or occlusion of communication between the ventricles and subarachnoid space. In seven patients with hydrocephalus, lack of communication was demonstrated clinically. Four cases of hydrocephalus, in which there was communication, were studied. In these cases there was low subarachnoid absorption. The probable cause of hydrocephalus following the excision of a meningocele is the limitation of absorbing surface.

Surgical treatment differs according to the variety of internal hydrocephalus. In the obstructive type the obstruction must be removed. In the communicating type it is necessary to increase the area for the absorption of fluid.

On the Extraction of Needles from Tissues. P. G. SKILLERN, JR., Philadelphia. *Interstate Medical Journal,* March, 1915.

When the *x*-ray is not available there are several important points to be observed in searching for a needle in the tissues. The field should be absolutely bloodless. This is accomplished by means of a Martin bandage. Local infiltration with novocain-suprarenin should be used, supplemented with nitrous oxide if necessary. The black track formed by the needle in the tissues should be followed, and the tissues should be properly retracted. No time should be lost in searching through the fat, since the needle always passes through this down into the fascia or deeper. Incision should be ample and the dissection should be carried on in planes, *i. e.,* the fascia, then the muscles, etc., down to the bone. When found, care must be taken to make traction only in the long axis of the needle in order to avoid its breaking.

The Injection of a High Percentage of Carbolic Acid in Camphor and Alcohol Solution Against Phlegmons in Joints and Tendon Sheaths. (*Hochprozentige Karbol-Kampfer-Spiritusinjektionen gegen Phlegmonen in Gelenken und Sehnenscheiden.*) G. W. SCHIELE, Naumburg, *Zentralblatt für Chirurgie,* March 24, 1915.

The solution Schiele employs is the following: Acidi carbolici liquefacti, 30.0; camphor trit., 50.0; spts. vini., 8.0. After opening the joint or tendon sheath by a small incision, he injects the solution directly into the joint or tendon sheath. He believes he has prevented destructive processes within the joint and has saved affected tendons from necrosis. He has never witnessed poisoning.

Resection of the Posterior Roots for the Cure of Little's Disease. E. M. BLAHD, Cleveland. *The Lancet-Clinic,* March 13, 1915.

The author reports ten cases, of which the first died, but the remainder all recovered. The death he attributes to failure to block off the higher centers by injecting novocaine into the spinal cord immediately above the site of operation. When this procedure is carried out there is no semblance of shock and this probably accounts for the very low mortality. The posterior roots are located by using the ligamentum denticulatum as a guide, that is, resecting only those roots which pass behind the ligament. If this is done there is no danger of cutting through the motor roots.

The author advocates using this operation in all severe cases of Little's disease, as he believes in this way only, may the extreme spasticity be overcome. Prolonged after-treatment is necessary to obtain good results.

The Recognition of Gas Phlegmons by Röentgen Ray. By SCHWARZ, GRAZ. *Wiener Klinische Wochenschrift,* January 28, 1915.

Schwarz shows X-ray pictures in which the diagnosis of gas bacillus infection of the wound was made. The air bubbles are shown as dark spaces in the negatives, resembling somewhat the appearance of Swiss cheese.